

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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Double Endless Bed Surfacers.

We show on this page a new double endless bed surfer just put on the market by the Bente & Margedant Company, of Hamilton, Ohio, and embracing a number of valuable features.

In endless bed or chain planers, it must be remembered, the whole bed surface, which in other machines resists the feeding movement, moves on with the material, bringing it under and past the rotating cutter-head. There is nothing in the device to slip, because the very rest or support of the lumber moves along. It is all "go." Notwithstanding the advantages of the chain-feed, however, it has not found its way into all shops where lumber is planed, because in many planers of this class the traveling chain-bed or the supporting slides very soon wear out of line, and require expensive repairing.

It is interesting, therefore, to note the manner in which this complaint has been overcome in the machine which we illustrate.

Referring to the engraving, which shows in the front one of these series of slats comprising the traveling bed, it will be noticed that the form and design of the slat is novel, being a slat strengthened by a hollow cored supporting brace starting from the ends and increasing in proportion toward the middle, all cast in one piece. One of the ends of the slat shows it with the plate removed, exposing a recessed chamber which is filled with cotton fabric for carrying a quantity of lubricating oil. The other end of the slat shows this chamber covered by a hard cast-steel plate provided with five holes. The center hole is an oil hole, and the four others are for rivets to fasten the steel plates to the slats. Every slat is "faced" with a hard cast-steel sliding plate which is removable should there be occasion for it. Every slat carries its own permanent supply chamber of lubricating oil, from which the lubricant is uniformly and automatically discharged when needed, and, being hollow, it equalizes the pressure of the air on the two close-fitting surfaces.

The steel plates used are not planed or milled to a uniform thickness, but are of standard sizes and measurements, as found in any steel warehouse, ground to a smooth surface after tempering. The rests for the steel plates are all planed carefully to a uniform height, so that a renewing can be accomplished without the assistance of a machinist. All the various sizes of endless bed planers built by the Bente & Margedant Company have only two supports for the endless bed, so that an uneven wearing or a rocking motion of the slat or bed cannot take place. The wider planers are supplied with stronger braced slats and broader sliding faces and rails, but all the rails on which the endless bed travels are made in full thickness of the finest tool steel. They are carefully ground by special machinery on the top and bottom to a perfectly true and straight line. Thus arranged they will not cut or wear irregularly, but will soon assume a wearing finish offering only slight resistance to the sliding pressure of the traveling bed. Endless bed planers of this construction have, we are informed, been in constant hard service for the last few years, and none of them have required any repairing or renewing on account of abrasion or cutting of the sliding surfaces. Three different sizes of this machine are made to plane 26, 28 and 30 inches wide.

The frame of the machine is built very massive and strong, with a broad rest on the floor. The connections and binding braces which hold the two sides together are made especially strong and heavy, thus forming an unyielding support for the traveling bed, which remains at a uniform height for all thicknesses of material. It will be seen that this arrangement of a fixed bed insures freedom from trembling and jar, as the framework of the bed binds the machine firmly together. It also does away with the troublesome annoyance of raising and lowering the bed for different thicknesses of material, and with the unavoidable wear of the bed slides and raising screws and with the rocking motion of the bed. It also reduces the work of handling light and heavy lumber, as the receiving and discharging trestles can be maintained at a uniform height, doing away with constant readjustment. The upper cylinder with its heavy housing raises and lowers on inclined dovetailed slides, supported by heavy stands, by means of a crank operating through miter gearing on heavy raising screws. It can be a justed for planing material up to 16 inches in thickness.

The cutter cylinders are provided with fine steel journals 11 inches long, and are of the triangular shear-knife pattern, as shown in Fig. 2. The three knives are placed at

such an angle as to produce a shearing or draw cut, thus preventing any splintering or tearing. It is supplied with a driving pulley of large diameter on each end with momentum disks. The swinging bonnet forms at its lower side a well-arranged chip-breaker, situated very close to the cutting line. It swings very conveniently out of the way for sharpening the knives and other purposes. Two heavy-weighted idler rollers are connected with the cylinder housing, one in front and the other in the rear of the cylinder. The pressure on these rollers can be regulated to suit the requirements of the material, as their office is merely to hold the material in close contact with the traveling bed. An adjustable scraper keeps the back roller free from gum and resin.

For planing strips of irregular thickness the planers are supplied with the Brown differential sectional feed roller illustrated in Fig. 3. It consists of a series of sections, each yielding independently of the other to irregularities in thickness. For many kinds of work

feed rollers (when provided) are placed in the rear of the lower cylinder. They are 6 inches in diameter, and, as the illustration shows, are very strongly geared with wide, heavy gearing. They are positive and powerful in action and quickly adjustable for variation in material. They are well supported by bracing stands. The lower feed roller, though adjustable independently for height with the back table of the lower cutter head, raises and lowers with the cutter-head and back table. Operators will see the importance of this combination, as much time and labor are thus saved in establishing the relative adjustment of these three important parts, which have a fixed relative adjustment, admitting of quick change for thickness of cut while the machine is in operation. The links of the expansion gearing are placed in such a position that they do not twist or retard easy motion.

There are four regular changes for the speed of the feed, and changes can also be made while the machine is in motion by

the cube of 1,000, or 1,000,000 part, of what it is at a distance of only 1 foot from that point, or, in other words, if the power at 1 foot from the spot be represented by 1,000,000, at the distance of 100 feet it will be but 1. It is thus seen that the effects are intensely local, and but comparatively trifling at even short distances.

Impregnated vs. Natural Samples of Wood.

In the excerpt minutes of the "Proceedings" of the British Institution of Civil Engineers we find results of a series of interesting experiments made in Germany a short time ago with impregnated and natural samples of wood. The object of the experiments was to ascertain the relative effect on impregnated and natural pine wood samples of various treatment, corresponding as nearly as possible to that to which wood piling is subjected. The investigations were directed to the following points: 1.

The British War-Ship Benbow.

The British man-of-war Benbow, recently completed and now receiving her armament, is one of the six vessels of the Admiral class, so called from bearing the names of six famous admirals—Anson, Collingwood, Camperdown, Howe, Rodney and Benbow. They are all barbettes ships, the guns being mounted inside a fixed circular breastwork of thick armor-plating, wherein the gun revolves on a turntable, and fires over the breastwork. The barbettes are placed one at each end of the superstructure or 'midship battery, and the guns have each a clear range of 230°, viz., from 25° abaft the beam to all round the bow or stern to 25° on the opposite side, and converging upon an object on the broadside at about 50 yards. The Benbow has been chosen as one of the six vessels of this class to mount two guns of 110 tons each, one being mounted in each barbettes; whereas in the other five vessels two guns are carried in each barbettes but of 63 tons only instead of 110 tons. These terrible engines of warfare would be most destructive in action, and are, in fact, formidable weapons, but in some quarters such enormously large guns are not viewed with much favor. England, in the matter of adoption of such heavy guns, has been following in the wake of Italy.

In addition to the two 110-ton guns the Benbow carries a battery of 10 6-inch guns, 12 rapid-firing guns and 14 machine guns, these latter very conveniently arranged for use against torpedo-boats. She is also fitted with four torpedo ports on the broadside and one through the upper part of the stern, all above water. The Benbow was launched on June 15, 1885, and has since that date been lying near the works for the purpose of receiving her machinery and boilers, and for the completion of the multitudinous fittings of a modern ship-of-war. It would be impossible to describe on paper the character of such fittings, including the pumping, draining and ventilating some 130 separate compartments, each compartment being fitted with an automatic valve, where the ventilating pipe or trunk passes through, so that in the event of the water entering any one compartment, and rising to the height of the trunk—the trunk being assumed to be possibly damaged—the water would close the valve, and so be confined to the damaged compartment. Some idea of the complication of the gearing in a modern war vessel as fitted in England may be obtained when we state that no less than 83 water-tight doors and armor deck shutters are fitted in this vessel, in addition to 85 water-tight doors that open and close by hand without gear. The deck plates, to which indicators are fitted, showing when each door or valve is open or closed, amount to no less than 250, in addition to the automatic valves above named.

Then, including the main engines, fan engines, pumping engines, electric light engines, steam steering and capstan engines, there are no less than 40 separate sets, all to be kept in proper going order.

The dimensions of the Benbow are as follows: Length, 330 feet; breadth, 68½ feet, and depth, 37 feet. The engines, supplied by the well-known firm, Messrs. Maudslays, Son & Field, are of the three cylinder compound type, of 7500 indicated horsepower, and reaching 9000 with forced draft, giving an estimated speed of 16 knots. The Benbow, like other ships of this class, is of the citadel type; this means that the vital portion of the vessel for about half of her length is protected by being included in an iron box armored with 18-inch plates on the side, the top of which at full draft is 2½ feet above and 5 feet below water, giving a total depth of 7½ feet. The armor-ship bulkheads forming the two ends of the citadel are 16 inches thick; before and abaft these there is an armor deck of 3-inch steel plating. Except for this steel deck, which is calculated to shield all below it from the fire of very heavy guns, the ends of the vessel are unprotected, and in a heavy engagement the superstructure would suffer severely. In the case of other types of war vessels protection is afforded by a belt of armor plating all fore and aft, being thickest amidships and tapering toward the ends; but it is evident that all that could be done on the dimensions and displacement of the Benbow has been done, for in order to provide for the armor deck and additional freeboard of the Nile and Trafalgar the displacement tonnage has had to be increased by 2000 tons, making them 12,000 tons displacement, instead of 10,000, as in the Benbow. Recently steam was for the first time admitted into the huge cylinders, when immediately the engines in both engine-rooms started almost simultaneously, and continued

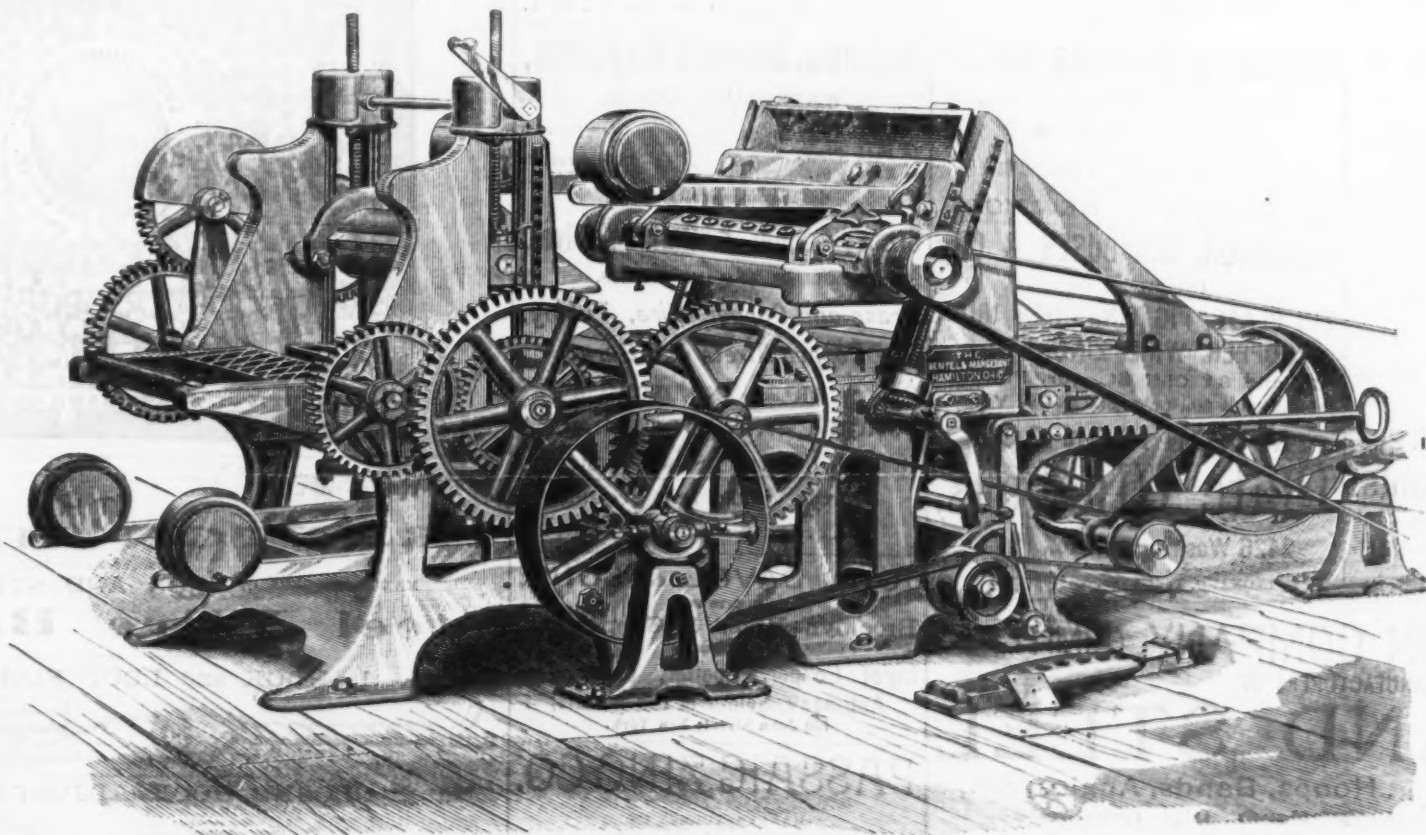


Fig. 1.—General View.



Fig. 2.—Triangular Cutter Cylinder.



Fig. 3.—Differential Sectional Feed Roller.

DOUBLE ENDLESS BED SURFACER, BUILT BY THE BENTE & MARGEDANT COMPANY, HAMILTON, OHIO.

this arrangement is of importance, as a number of strips can be fed along side by side, regardless of thickness in the rough. The lower cutter cylinder, where more than one cutter-head is employed, is located at the back end of the traveling bed, and is especially arranged for quick adjustment. It rests in a strong combined housing which retains the long self-oiling journal-bearings in accurate line. It raises and lowers upon long vertical slides provided with adjusting gibs, by means of a crank wrench operating through worm gearing on two vertical screws, insuring simultaneous action and easy adjustment. There are two adjustable tables, one in front and the other in the rear of the lower cutter-head. The one in front can be adjusted in line with the traveling bed. It is supplied with handles by which the whole table can be swung back out of the way, giving free access to the head. As already remarked, the housing of the lower cylinder raises and lowers by a worm and screw device for any required height above the first table, and independently of it for any thickness of cut. This adjustment can be accomplished while the cutter-head is in operation. The table back of the cutter-head raises and lowers with the housing, so that it always remains in line with the cutting line of the cylinder. This table can, however, be adjusted for height if necessary, and can also be lifted entirely out of its bearings without the loosening of bolts or nuts. A resisting pressure-plate of large dimensions, operated by combined vertical screws and handles (when no feed rollers are supplied) holds the material firmly down when operated upon by the lower head. When feed rollers are provided the pressure-plate adjusts with the rollers, as shown in the engraving. Graduated scales conveniently placed show at a glance the position and height of parts adjustable for various thicknesses of material. The carrying-out

means of the handle shown in the cut. This arrangement is important, as it enables the operator to start and stop, or to feed slowly whenever split and cross-grained parts of material are being worked. The weight of the 26-inch machine is 5800 pounds.

Important Electrical Decision.—An important decision has just been rendered in the Chancery Division of the High Court of Justice, London, before Mr. Justice North, in the suit of Abraham Van Winkle, of Newark, N. J., U. S. A., vs. William Alexander Carlyle, of Birmingham, England. This was a suit for infringement of dynamo electric machines for electro-plating, owned by the said Van Winkle, of the firm of Hanson, Van Winkle & Co., Newark, N. J., and has been some time pending in the English courts. An interim decree for injunction having already been granted, it has now been made absolute, the defendant being restrained during the continuance of the letters patent or any extension thereof from making or selling a magneto-electric machine under or in accordance with or in violation of the letters patent on which the suit was brought. The plaintiff's solicitor in this suit was Mr. Frederick Marshall Barton, solicitor to the American consul, Birmingham, the attorneys Messrs. Thomas White & Sons, London and Mr. Theodore Aston, Queen's counsel, the eminent patent solicitor being retained. The firm of Hanson, Van Winkle & Co., were the first introducers of dynamo electric machines in this country, and the above decision is likely to have considerable influence on the sale of their new machines both here and abroad, as this is considered a test suit.

The power exerted by an explosion on surrounding objects is in the inverse ratio of the cube of the distance from the point of explosion. Thus, at 100 feet from the exact point of an explosion, the power is only

The effect of acids, urine and liquid horse-dung on impregnated samples. 2. The effect of atmospheric influences on the same. 3. The hydraulic absorption of impregnated and natural samples. 4. Expansion in consequence of absorption. 5. Resistance to bending of impregnated and natural samples. 6. Resistance to compression of impregnated and natural samples. The acids used were hydrochloric, sulphuric, nitric and phosphoric, all with a strength of 10 per cent. The impregnated samples, after subjection for 14 days to the various substances named, were found, on careful examination with a microscope, to be unaffected by them. Atmospheric influences were artificially produced. The samples were, a, slowly heated in water to boiling point, kept for some time at this temperature, and then suddenly cooled by plunging into cold water; b boiled half an hour in a 15 per cent. solution of salt and frequently cooled suddenly during this time; c boiled half an hour in a 5 per cent. potash solution; d boiled half an hour in the same solution, with an addition of 1 per cent. sulphide of ammonia; e boiled half an hour in a solution containing 2 per cent. sulphate of iron, 2 per cent. sulphate of copper, and 10 per cent. of common salt. The samples were not injuriously affected by this treatment. Impregnated samples of wood absorbed much less water than those in a natural condition. The increase in volume in consequence of the absorption of water was less in the impregnated than in the natural samples. The tests on the bending strength of the samples showed that those impregnated were stronger by about 15 per cent. than the others. The resistance to compression of the impregnated samples was greater by about 22 per cent. than that of the natural samples. Before testing for absorption all the samples were thoroughly dried. The method of impregnation, at the request of the manufacturers, is not described.

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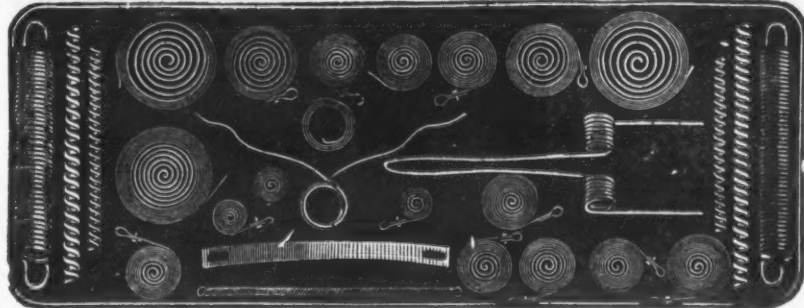
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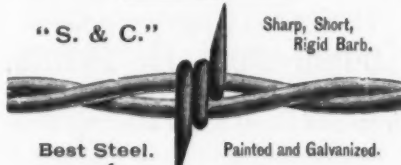
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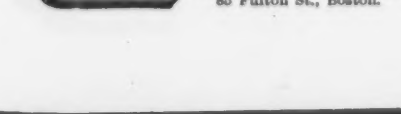
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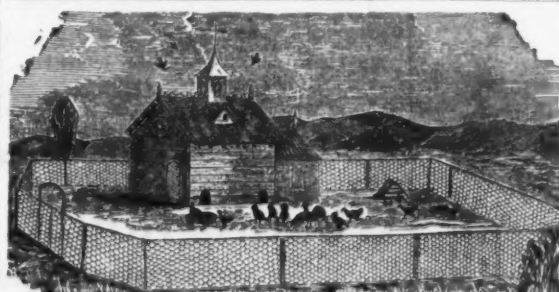
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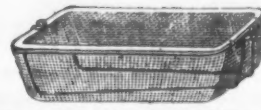
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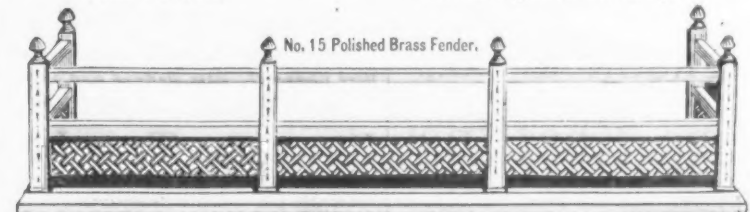
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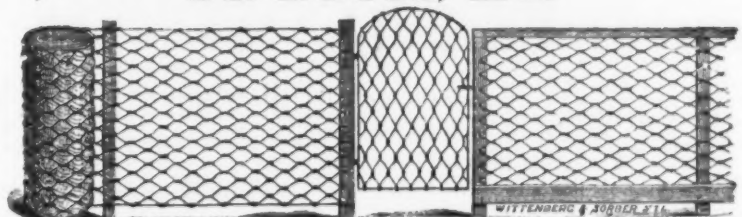


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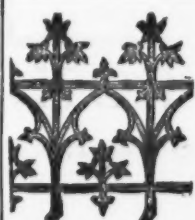
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steaming for three hours, thus showing that all was in perfect order. The Sans Pareil, a sister vessel to the Renown, building at Newcastle, a vessel of somewhat similar dimensions to the Benbow, is making rapid progress and is to be launched in the spring of next year, some 3000 tons of material being already worked into place on the slip previously occupied by the Benbow; 16 of the massive armor plates are already in place weighing 20 tons each. The huge wrought-iron stern-post for the new Italian armor-clad Re Umberto is being forged and machined at these works also, which, considering the dearth of work everywhere, appear to be fairly busy.

Austrian Basic Bessemer and Open-Hearth Works.

In the years 1884 and 1885 two Swedish engineers, J. N. Danielsson and B. Wiklander, made a series of extensive trips through the metallurgical centers of Austria, Germany, Belgium, France, Great Britain and the United States, and they are now publishing in the *Jernkontorets Annaler* a series of articles embodying the results of their observations. One of them deals with the Austrian works, concerning which little is known in the United States. At Witkowitz there is a plant in which both an acid and a basic Bessemer works is carried on, both of them being supplied by the same blowing engine, the charges being so arranged that blowing is carried on alternately in the acid and in the basic vessels, three-quarters of an hour elapsing between each blow. For changing bottoms 10 minutes is required, and for replacing converters 30 minutes. Both the body of the vessel and the bottom is lined with basic brick and tar, the method being to dip that part of the brick which is to be added to the work already laid in each tier, and then distributing fine depulverized refractory material upon it and stamping it into the cracks, and finally giving it a coat of tar. It is stated that these refractory basic brick are low in magnesia, having the following composition: 2½ per cent. silicon, 6.9 per cent. oxide of iron, a trace of alumina, 82.75 per cent. of lime and 5.57 per cent. of magnesia. The raw material is ground as fine as possible, and the brick are very sharply burnt, shrinking 45 per cent. The bottoms have four tuyeres each, with five holes 0.4 inch in diameter. All the tuyeres are placed near the center of the bottom. One converter lining will stand 45 to 60 blows and the bottom 15 to 20. The drying and warming of freshly-lined vessels is carried out with the aid of gas from a producer charged with one-third bituminous coal and two-thirds coke. The more rapid the blow is in the basic converter the hotter it is. Up to the period of dephosphorizing, the blowing lasts from 6 to 18 minutes, the average ranging between 8 and 14 minutes. Dephosphorizing begins as soon as the carbon contents of the bath have been brought down to 0.10 or 0.05 per cent., and the afterblow lasts about one-half of the time required to bring it to that point. The phosphorus contents of the metal are judged by a small round sample which is hammered out under a steam hammer, and is hardened and bent until fractured. If the sample shows too much phosphorus the converter is turned up and blowing is continued. The fracture of the sample must not show bright streaks, since the latter indicate too high a phosphorus contents. The following are the results of the Witkowitz basic plant for five months, the metal being used for rails, plates and tires:

Materials.	M. tons.
Pig iron charged into reverberatory furnace	17,133.9
Limestone	3,759.2
Coal for steam	2,750.0
Coal for melting pig and spiegel	5,354.5
Coal and coke for gas producers	371.8
Limestone for slagging in gas producers	16.4
Output.	M. tons.
Ingots	13,771.5
Ladle skulls, scrap, &c.	176.3
Small scrap	95.6
Shot	366.0
Alumina	4.2
Oxide of iron	2.54
Protoxide of iron	13.55
Protoxide of manganese	5.86
Magnesia	0.80
Lime	45.36
Sulphur	0.10
Totals	98.70

The requirements of refractory material per 1000 kg. are 103 kg. for the basic process and 32 kg. for the acid process. Every second charge is taken direct from the blast furnaces, alternate blows being made from the reverberatory furnaces used for melting. The charges range between 5 and 6 tons, and no scrap is added during the blowing, because the blows are of themselves so cold that often ladle skulls are formed. The final addition is about 20 kg. of spiegeleisen. As an average for six successive blows the pig iron used contained 0.50 silicon, 3.55 phosphorus, 0.09 sulphur, 0.13 copper, 2.42 manganese. The metal obtained in six charges previous to the addition of spiegel carried 0.08 carbon, a trace of silicon, 0.06 phosphorus, 0.015 sulphur, 0.22 copper and 0.25 manganese. After the addition of spiegel it ran: 0.20 carbon, a trace of silicon, 0.045 phosphorus, 0.02 sulphur, 0.21 copper and 0.37 manganese. The cinder which resulted during these seven blows was composed as follows:

	Before addition of spiegel.	After addition of spiegel.
Phosphoric acid	20.77	18.98
Silicon	5.70	7.60

In Teplitz there are three basic converters, against two at Witkowitz. In both instances the pig iron is obtained in reverberatory furnaces, because the melted iron is hotter than it would be obtained from a cupola. This makes it possible to employ a raw material lower in silicon, which is a considerable advantage in dephosphorizing. It is stated that at Teplitz the iron averages 2.2 per cent. of phosphorus, only 0.1 to 0.15 of silicon, ½ of 1 per cent. of manganese and of sulphur. Besides the exceptionally low percentage of silicon, the manganese, too, is small, which makes the excellent results, so far as quality is concerned, all the more notable. Formerly only pig iron from Peine, in Northern Germany, was used, since

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HAMMERED AND ROLLED
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BEST REFINED TOOL CAST STEEL

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SAW PLATES

For Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

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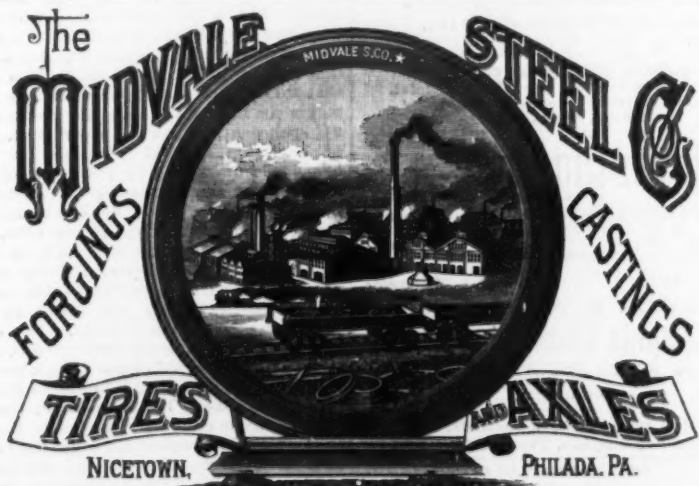
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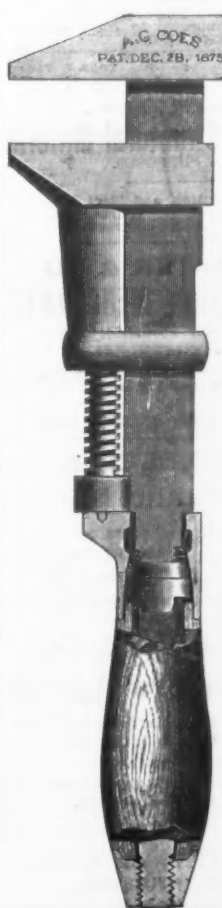
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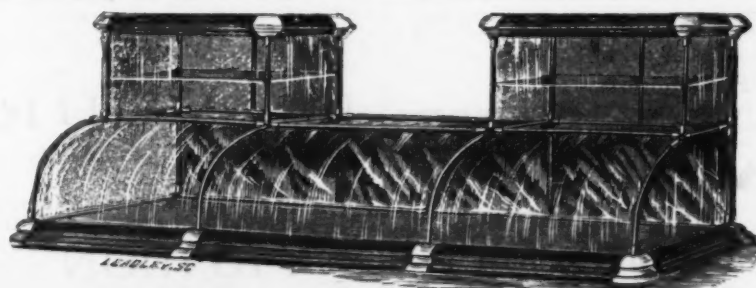
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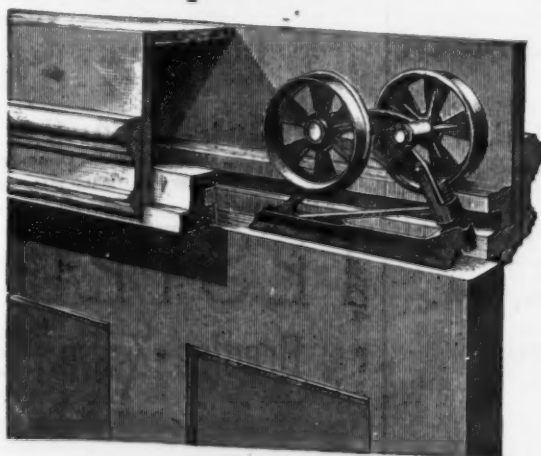


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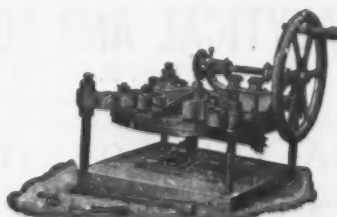
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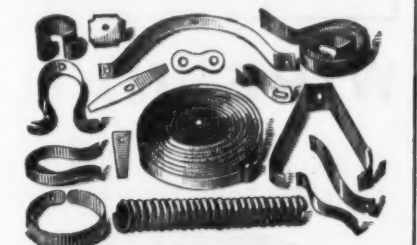
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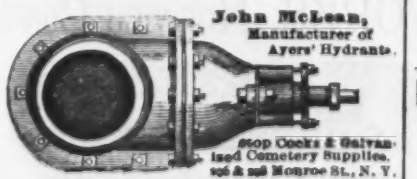
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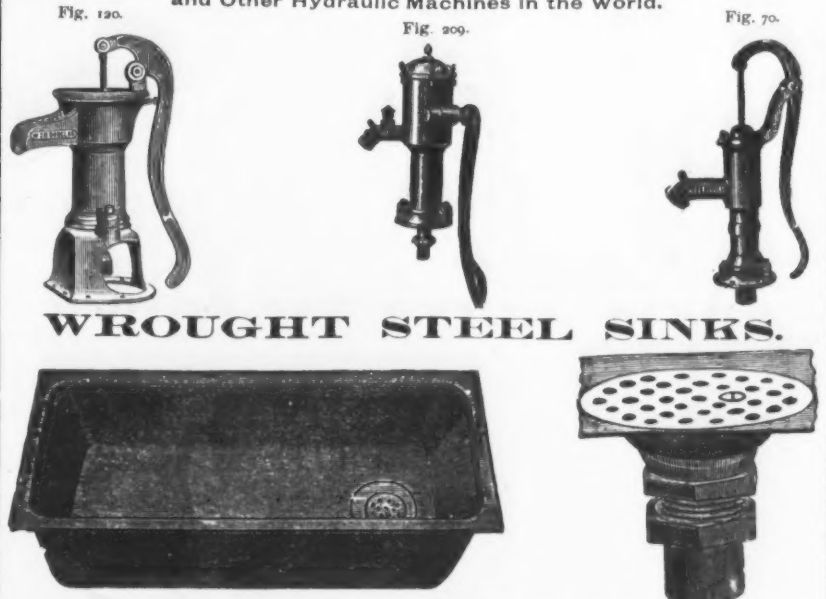
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By sliding a stud on the back of Chuck it is instantly changed from Universal to Independent, and vice versa. Each Chuck is guaranteed perfect. All parts are made interchangeable. Only the very best materials used in their construction. Reverse or special Jaws furnished when desired. Reverse or special Jaws furnished when desired.

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it is the best adapted in the world for the Thomas process. Now only Bohemian iron is employed, but, as the ores used in Bohemian furnaces are very low in manganese, Bessemer slag from the Alpine district is added to the furnace charge in order to get over this drawback. In Teplitz from 20 to 44 8-ton blows are made in 24 hours. The blowing lasts 15 to 16 minutes, the afterblow being regulated by a given number of revolutions of the blowing engines, for which purpose a counter is provided on the pulpit. At both works it is usual to cast from above. It is stated that arrangements have been made to cast small ingots at Teplitz, which will make it possible to roll merchant sizes in a single heat. At the time the engineers in question were at the works these arrangements had not yet been patented and were not shown to visitors. The mechanical arrangements for casting at Teplitz are the ordinary ones with a central hydraulic crane between the converters. At Witkowitz the ladle is carried by an engine to the casting pit, located at some distance from the converters. At the latter works basic steel is said to cost 80 kreutzers per 100 kg. more than acid metal. The Teplitz basic plant is better managed than the majority of the others. This is necessitated by the competition of the charcoal iron of the Alpine district. The carbon must for that reason be kept very uniform, so that in the final product it must certainly be within a range of 0.05 to 0.09. It is natural that in making a high grade of product great care must be given to the uniformity in the composition of the pig employed. So far as dephosphorizing is concerned, the following series of 20 successive blows made at Teplitz was analyzed for phosphorus in the laboratory of a neighboring works, with the result: 0.03, 0.03, 0.02, 0.02, 0.02, 0.03, 0.02, 0.02, 0.01, 0.02, 0.01, 0.03, 0.04, 0.04, 0.03, 0.03, 0.02, 0.02, 0.02, 0.02, the carbon varying from 0.06 to 0.09 and the manganese from 0.24 to 0.28. The strong oxidation of the bath, which must always take place in the basic process, calls necessarily for a large addition of manganese, and as a result thereof the manganese contents found in the final product cannot very well be kept down low; even the softest Thomas steel rarely has less than 0.25 per cent. of manganese, and very often its contents are about 0.3. So far as the much-contested elimination of sulphur is concerned, there can be no doubt that it is sufficiently attained in Teplitz. For many months pig iron carrying as much as 0.15 sulphur has been blown to make a product of 0.04, and even sometimes less, of sulphur. Thus the desulphurization is affected by continuing the afterblow after dephosphorization. It is true that in this manner the waste is increased and the quantity of manganese to be added grows larger, and that to some extent the quality of the product may possibly be endangered. Special attention must be given to the point that this afterblow must not continue too long on steel almost free from foreign substances, and it is stated that a small percentage of sulphur has a tendency to increase the amount of gases absorbed by the metal. Although, therefore, desulphurization in the converter seems possible, it is more easily carried out in the blast furnaces, and should be done there. Neither at Teplitz nor at any other basic works is molten steel quiet. This in some cases must be regarded as a drawback, although some of the Sheffield manufacturers fear a dead steel, and a cold rising metal is better for some purposes than hot dead steel. A sample of the steel made in Teplitz analyzed in Sweden yielded the following results:

Carbon	Per cent.	Sulphur	Per cent.
0.09	0.04	0.04	0.25
0.04	0.04	0.04	0.25
0.038	0.04	0.04	0.25

A specimen of best quality Swedish open-hearth metal sent to Teplitz for comparison showed 0.108 carbon, 0.016 silicon, 0.032 phosphorus and 0.1 manganese. Teplitz plate ingots contained:

Carbon	Per cent.	Phosphorus	Per cent.
0.060	0.08	0.08	0.08
0.060	0.08	0.08	0.08
0.060	0.08	0.08	0.08

Another steel for beams carried:

Carbon	Per cent.	Phosphorus	Per cent.
0.066	0.340	0.340	0.340
0.066	0.340	0.340	0.340
0.066	0.340	0.340	0.340

As a general rule the open-hearth process is kept more secret and difficulties are encountered in any efforts to state any length of time or to obtain correct data concerning it. It is true that in many localities the process has not been introduced for a long time, and it is possible that only little that is definite is available. It is a fact, however, that at the present time the open-hearth process is gaining ground more rapidly than any other. The use of ore toward the end of the process is becoming general in Great Britain, and it must be admitted that with it a good product is obtained, and that it offers a substitute in the absence of good scrap or high price for it. However, the addition of ore does not yield so good a metal as if obtained by the exclusive use of pure pig or scrap. Wherever it is used the addition of a little ore toward the close of the process is regarded as a means to render more easy the mixture of large charges, because it causes an ebullition of the bath at a time when the carbon contents begin to be small. Some works which make a speciality of exceptionally good quality take extreme care to avoid such an addition of ore. The Swedish engineers did not see the advantage of its use, because whatever is gained by rapid decarbonizing of the bath is lost by the necessity for making both hot and fluid, and by the damage to the furnace growing out of the use of ore. If instead of using ore, preheated scrap is employed, the charge works more rapidly, the quality of the work becomes better, and there is a saving in repairs. At Witkowitz there is a 10-ton furnace, open-hearth, producing annually about 3000 tons of ingots and making 120 to 150 charges without any notable repairs. The charge contains about 15 per cent. of pig iron, and the waste ranges from 4 to 6 per cent. Of the two producers belonging to that furnace only one is used. It is charged with two-thirds coke and one-third coal, and some lime is added to slag the ash. The consumption of fuel is 45 to 50 per cent. of the product. The producer gases are not passed

through the regenerator, since they enter the furnace with a temperature of about 600 F. Latterly water gas has been employed in running the Witkowitz open hearth steel plant, and it is stated with the best of results. At Donawitz there are two open-hearth furnaces, the larger of which makes 60 to 70 tons and the smaller 50 tons per week. The product for the year 1883 was 4953 tons and in 1884 was 4028 tons of ingots and 1011 tons of rails, tiers and miscellaneous castings. The consumption of fuel, which is lignite, is 66.63 per cent., to which must be added 21.20 per cent. of slag for the preheating furnaces. The furnaces will stand from 120 to 200 charges, producing chiefly soft stock, though rarely going lower than 0.17 carbon. For every 500 ingots the charge is 25.82 per cent. of pig iron, 0.57 per cent. of ferromanganese and 81.27 per cent. of scrap and muck bar. The crew for the furnace is, per shift, one melter, three helpers, one boy and three men at the producers for two shifts.

English Letter.

(From Our Regular Correspondent.)

LONDON, September 27, 1886.

THE WEEK

has not been a very eventful one, but so far as we can judge from its outward results the influences of the time being have been in favor of greater hopefulness and some little augmentation of commercial activity. The political outlook is not yet wholly satisfactory, but it is believed that the embroglio in the Balkans is of such a nature that no one of the powers chiefly concerned will permit any other power to assume the function of settling things to its own liking. In this way it is hoped that the threatened war may be avoided or rather postponed until after the decease of the Emperor William of Germany, whose demise, whenever it takes place, will almost certainly be the signal for reopening the entire Eastern question. Meantime the evil day is postponed and commerce is temporarily freed from the weight which has pressed so heavily upon it during the past few weeks.

So far as our iron market is concerned I give you the leading features elsewhere, but may add that there is an impression in many quarters that the final quarter of the year is not unlikely to afford some compensation for its predecessor's falling off. There is much better news from Australia and other parts of the world, owing to the enhanced values of wool and other raw produce, which rise will enable the countries affected to return us good for the good we do them. The reported gold discoveries in South Africa, Tasmania and Western Australia are also hailed as being good omens, inasmuch as any considerable increase in the supply of the precious metal would undoubtedly have the effect of promptly and (probably permanently) augmenting the values of all commodities. With such an augmentation there would probably come a very marked increase in the demand from all parts of the world.

SCOTCH PIG IRON

is a little staidier on the whole, and has improved in value to a slight extent during the past week under influences which have been partly legitimate and partly speculative. There are now only 77 furnaces in operation (50 on ordinary Scotch pig), as against 90 a year ago, so that the make is appreciably less. Notwithstanding that fact 3529 tons were added to Connal's stock last year, making the total there 822,156 tons, as compared with 624,874 tons this date last year, or an increase of nearly 200,000 tons in the 12 months. The shipments are 41,903 tons behind to date, while the imports of Middleboro' pig iron into Scotland are 37,263 tons in arrears. Current prices are:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow	44/	41/3
Coltness, "	45/	42/3
Langloan, "	45/6	41/3
Summerlee, "	45/	41/3
Calder, "	45/3	41/3
Carbros, "	41/6	39/
Clyde, "	42/6	39/
Monkland, "	41/	39/6
Govan, at Broomfield, "	41/6	39/6
Shotts, at Leith, "	43/6	43/
Carron at Grangemouth, "	46/6	43/6
Glenearnock, at Ardrossan, "	42/	40/
Eglington, "	40/	39/6
Dalmellington, "	40/6	38/

MIDDLEBORO' PIG IRON

seems to be a little staidier now that the restriction scheme is in operation, and values are somewhat firmer at the subjoined rates for G. M. B., f.o.b. at makers' wharves in the Tees, net cash:

No. 1 Foundry.	38/	Mottled	39/
" 2 "	32/	White	38/6
" 3 "	30/6	Refined metal	46/
" 4 "	30/	Knottledge	39/
" 4 Forge	29/6	Cinder	27/6

HEMATITE PIGS

are a little firmer, and are reported to have an upward tendency. The current rate for mixed lots of Nos. 1, 2 and 3 in usual proportions is 42/6 per ton. Shipments are heavy, and the local consumption is good. Prompt lots are said to be quite safe. Some of the makers are asking 5/ per ton more money, and many of them decline to enter into long forward contracts at the present prices, the impression being that values must advance shortly.

THE IRON MARKET

has not developed any new feature during the week, but it is satisfactory to report that the better tone and more hopeful feeling still prevail, and also that the opinion is more freely expressed that a turn in the long lane has been reached. In Cleveland some holders have quoted 30/3 per ton for No. 3 G. M. B., but the more general rate has been 30/. Business has not been extensive, either in the number of lots that have changed hands or in the size of them. Buyers affirm that they are tolerably well bought forward, and makers allege that they are waiting until the near-at-hand quarterly meeting. On the West Coast there is no large demand, but it is decidedly better than it was, and makers quote 42/6 for mixed numbers more firmly than they did a week or a fortnight ago. In

Paris, 1878. **McCAFFREY & BRO.,**
PENNSYLVANIA FILE WORKS,
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Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

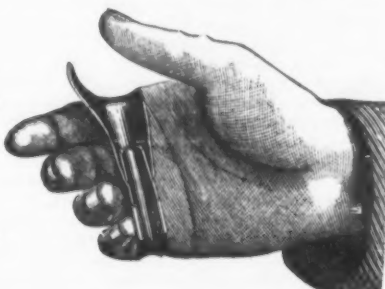
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Made for Either
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Can be Worn
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Will not make the Hands Sore! Made Entirely of Brass, without Straps, Web or Elastic Band.

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SEND FOR ILLUSTRATED CATALOGUE.

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LIGHTNING HAY KNIVES. WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY
HIRAM HOLT & CO., East Wilton, Franklin Co., Maine.
For sale by the Hardware trade generally.

CAUTION:
We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth for an improved Hay knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringements, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits have been already ordered.

All manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives which are not of our genuine manufacture.

HIRAM HOLT & CO.
East Wilton, May 10, 1886.

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Outside of all combinations.
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Easy.
Graceful.
Elegant.



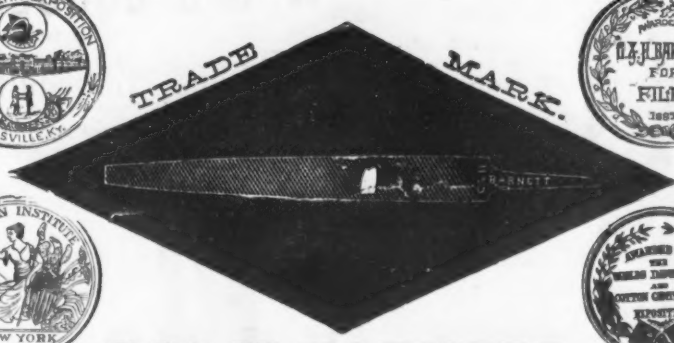
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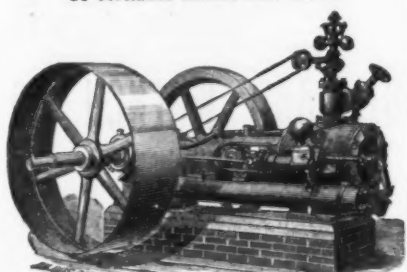
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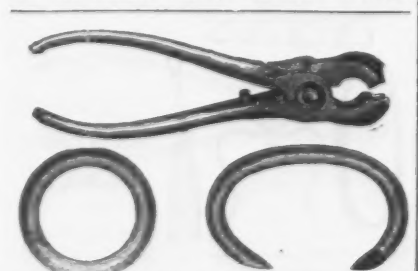
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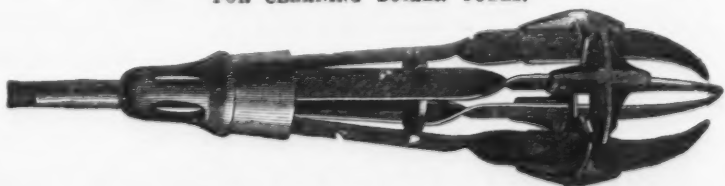
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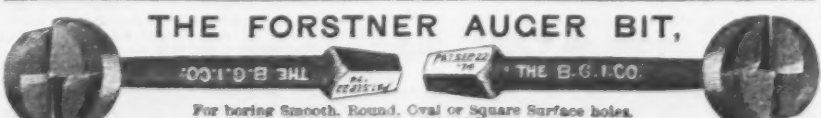
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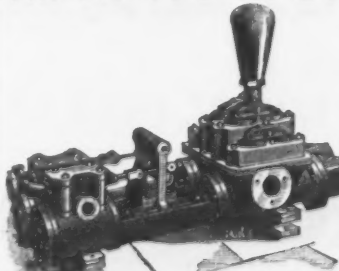
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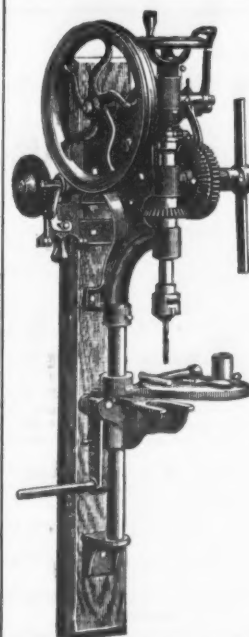
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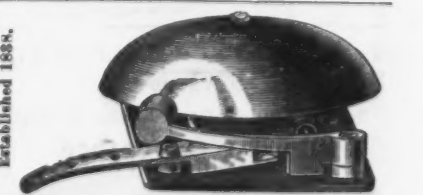
Pike's celebrated Blue Stone, Indian Pond (Red End), Lamolite, Black Diamond, Magic, Green Mountain, all kinds branded with our name are genuine.
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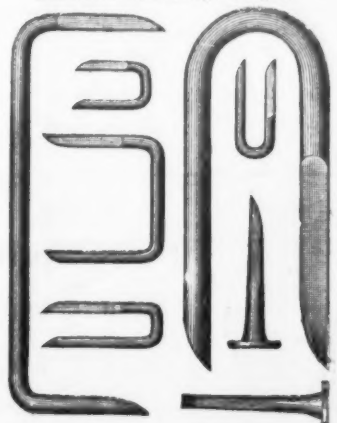


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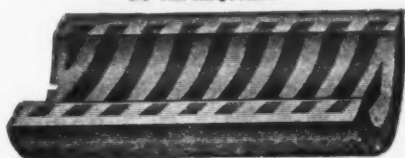
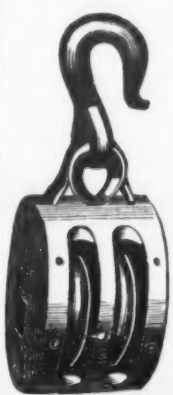
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High and Low Locomotives.

In an article on the relative merits of high and low locomotives the *Engineer* (London) says:

If the question were asked, "Given two vehicles, both having wheels the same distance apart laterally, but the height of the center of gravity of one greater than that of the other—which would be most likely to overturn in use?" the answer would be in most cases the vehicle with the narrower base in proportion to the height of its center of gravity. The adage that "circumstances alter cases" applies here, however, with more force than many persons are aware of. The locomotive engine supplies an example of this. For many years engineers held the opinion that the lower the center of gravity of a locomotive could be kept the steadier it would run; and the relative merits of engines with outside cylinders in this respect, as compared with those having inside cylinders, formed subject for debate. The inside cylinder engine necessitates a higher placed boiler than does an outside-cylinder arrangement, because of leaving clearance for the big ends of the connecting-rods, and room generally for the parts of the motion, and to give access to them. On the other hand, as an offset against the greater height could be put the action of the steam in the cylinders.

It is well known that the alternate pressure of the steam on the ends of the cylinders tend naturally to rotate the entire engine horizontally round a center or a turning point situate in the longitudinal middle line of the engine, the force being measurable by the total pressure on the lid or bottom of the cylinder, multiplied by the distance of the center of the cylinder from the turning point. The distance is a fixed measurement in any given engine, but the loads or stresses are constantly altering both in direction and magnitude. Thus, when both pistons are moving forward, each crank being at an angle of 45° with the horizon, the turning stress about the central point is equal to the difference between the steam pressures in the respective cylinders, which difference will depend upon the grade of expansion in use at the time. When, however, one piston is coming back toward the fire-box, while the other is still going forward, the cranks being again at an angle of 45°, the strain or steam pressures both act to turn the engine in the same direction; therefore the stress at the turning point will equal the sum of the stresses for each cylinder. A little reflection will show that, inasmuch as the centers of outside cylinders are considerably further from the engine center than are those of inside cylinders, the stresses on the cylinder ends act with proportionately greater leverage, and therefore with enhanced stress. The vibratory or "boxing" movement of small outside cylinder tank engines when running fast is very perceptible. The advocates of outside cylinders, however, claimed that this action, so far as danger of derailment was concerned, was, as we have observed above, compensated for by the lower center of gravity obtained. In the earlier days of railways locomotive engineers did not discern apparently so clearly as is now done the difference between strains causing an engine to overturn and those tending to make it leave the rails. The risk of an engine overturning while running is very slight, even when going round sharp curves. Indeed, we cannot call to mind any instance of an engine overturning when running while still on the rails and nothing broken. The danger of derailment, so far as the engine action is concerned, is to be found in horizontal lateral strains, such as hammer or grind the flanges against the rails, tending of necessity to break flanges, wheels, axles or rails; and here we may incidentally comment on the dearth of information extant about broken rails, as to the nature of the various examples of fracture. Did a rail break vertically or horizontally? Did it snap like sealing wax, without any previous permanent set bending? Information on the behavior of rails in this way would be both interesting and instructive.

It is gradually becoming admitted by locomotive superintendents that high engines run easier and with less jar and shock than low engines, and we venture to say that there are at this moment locomotive superintendents who, if they had to build their last set of engines over again, would set their boilers higher. The reason why the high engine is the steadier is this—the gauge of the rails represents the base of a triangle, and the center of gravity of the engine represents its apex. Now, if a side strain be caused to act on the apex of the triangle, it can be resolved into two other forces on the triangle if we regard it for the moment as a truss or as a solid body. One of these forces will create a rotating strain, resembling in effect the action on a crank, if we regard the lower corner of the triangle furthest from the pushing strain as the shaft, and the apex or point where the strain is applied as the crank pin. The lower corner of the triangle is the turning point of the strain, the purely rotary force being equal to the amount of the applied strain multiplied by the sine of the angle at the turning point. But, as we have pointed out, there is a lateral strain also, tending to simply push the triangular body sideways; and the magnitude of this stress will be equal to that of the applied force multiplied by the sine of half the top angle of the triangle or half its base. From this it will be obvious that the greater the lower angle and its natural sine, as compared with half the apex angle and its natural sine, the greater will be the over-setting or rotating force, and the less will be the lateral strain on the rail.

The high engine complies better with these conditions than the low. Consequently, the bursting action on the rails is proportionately reduced, while the margin of safety against the high engine over-setting is so great as to render the risk of danger from that cause altogether insignificant. For example, a body cannot overturn until its center of gravity overhangs its base. Before this could take place with an engine of 4 feet 3½ inches gauge, and whose center of gravity is 6 feet from the rails, the engine must be inclined to an angle exceeding 22°. Besides this, other elements of safety attend the high engine. For example,

as it strikes the outer rail of a curve with less force than does the low engine, there is less tripping action operating to cause an upset. The high engine, just as with the old high, narrow mail coaches, having their piles of luggage on the roof, and generally high center of gravity, has a long, gentle, easy swing, coming slowly into motion and slowly coming to rest again, without those jars and shocks strongly perceptible with low engines. Then as regards ease of traction or propulsion, as well as the diminished risks of broken axles, wheels and rails, and the reduced vibration influences on all parts of the engine, and their attendant evils in shaking nuts and joints loose, and causing crystallization, everything is in favor of the high engine. There may be men still alive who prefer the low engine, but we venture to think that they do so more from early impressions than from any specific reason, and that when they really study the matter carefully they will change their views.

It must not be forgotten that our reasoning is based on the fact that the locomotive is carried on springs. The effect of the high center of gravity is to produce an augmented stress on the outer springs and a diminished stress on the inner springs, and the higher the center of gravity the greater will this downward thrust be. If it was possible for the center of gravity to be at the same level as the rails, then the effect of the engine in passing round a curve would be wholly lateral, no vertical component being existent; and the elastic action of the springs would be eliminated. The high engine runs more easily than the low, because it makes better use of the elasticity of the springs on which it is carried.

TRADE PUBLICATIONS.

Machinists' and Engineers' Supplies.

The New York Supply Company, of 50 and 52 John street, New York, have issued two small catalogues. One of them is devoted to what are known as the Scientific portable forges, and shows 12 different styles of forges and blowers, and also several forms of drill presses and a combination vise and anvil. The other pamphlet is devoted to a brief description of the Hancock inspirator, and contains in addition engravings and particulars of asbestos packed cocks, straightway stop and check valves, steam traps, hydrostatic levels, &c. Both catalogues contain price lists and tables of dimensions, and will no doubt prove of interest to the trade.

Anti-Friction Metals.

E. A. C. Du Plaine, of Chicago, Ill., has issued a circular setting forth the advantages of his anti-friction and Babbitt metals. Machinery users and others interested in the reduction of frictional resistances in machinery will find it to contain a number of interesting particulars, and should give it attention.

Machine Tools.

A new catalogue issued by the Gaylord, Cross & Speirs Company, of Waterbury, Conn., refers in an interesting manner to their various forms of machine tools, embracing power and foot presses, drop presses, turret lathes, upright drills, wire straighteners and other specialties. The catalogue embraces 28 pages, and deserves careful attention.

Engines and Boilers.

The Skinner Engine Company, of Erie, Pa., have issued a new catalogue illustrating and describing a large variety of engines and boilers, and also steam engine attachments, such as stuffing-boxes, governors, counterbalances, cranks, &c. Then we find illustrations of portable engines, from 8 to 20 horse-power, detached engines and boilers, return-flue portable boilers, double engines, locomotive boilers and two plate stationary boilers, to which of late so much attention has been given. The engravings are well executed and the matter is arranged in a convenient form.

Electrical Supplies.

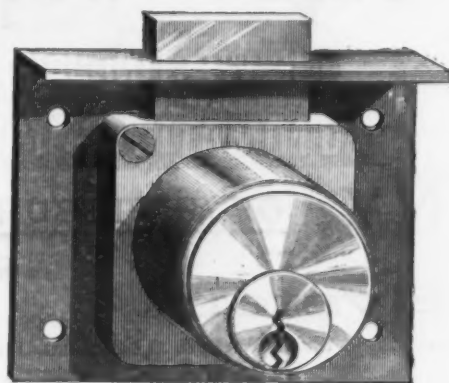
An extensive catalogue has just been issued by the Electrical Supply Company, of 17 Dey street, New York. It covers 160 pages and is profusely illustrated with engravings of various forms of electrical apparatus. The descriptions are more complete than usual in publications of this kind and deserve the attention of all interested in applied electricity.

Well-Boring Machinery.

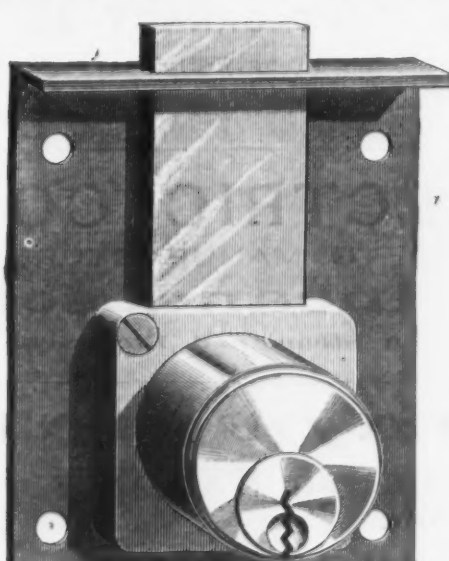
The American Well Works, Aurora, Ill., issue a new edition of their illustrative and descriptive catalogue and price list. An important feature of the new catalogue is the illustrated description of a new method of sinking wells. The improvement consists in connecting to the lower end of the tubing to be sunk an annular-shaped saw of the diameter of the piping. The piping is set on end in the derrick and is revolved by a mechanical contrivance which grips the well casing firmly and at the same time allows it to descend with comparatively little friction. The upper end of the tubing has a swiveled hose connection through which a stream of water is forced, which goes down the well casing and, passing between the teeth of the saw at the lower end, carries the dirt and debris that has been cut loose up on the outside of the pipe to the surface. As fast as one length of pipe is sunk into the ground another is connected without stopping the machinery, so that the operation is continuous. The catalogue contains over 200 pages and is illustrated throughout. All the goods are described and instructions given for operating the well-boring machinery, erecting windmills, &c.

The *Economist* says, in referring to a method of doing business which is creeping into this country also: "We are told that in the circulars issued this week by the London wholesale warehouses, announcing their 'show' of autumn goods, the 1st of December is given as the day on which pur-

New "Yale" Cabinet Locks.



FULL SIZE OF KEY.



We ask the careful attention of the trade to our new line of Yale Cabinet Locks with the Patent Corrugated Key. They possess a security never before attained in key locks, and in addition to this advantage they are easier to apply and handsomer when applied than any cabinet locks in the market. A full line for all purposes now ready.

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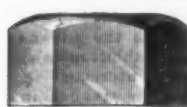
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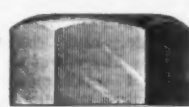
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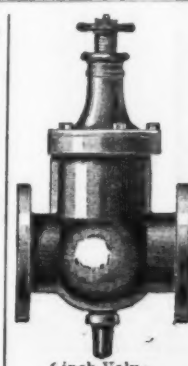
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Pressure Regulator,
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STEAM and WATER,
is made entirely of metal;
occupies the same space as
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Manufacturers of
CAST SHEARS.
The Best and Cheapest in the market. Lamp Trim-
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THE "JUNIOR" AUTOMATIC ENGINE.

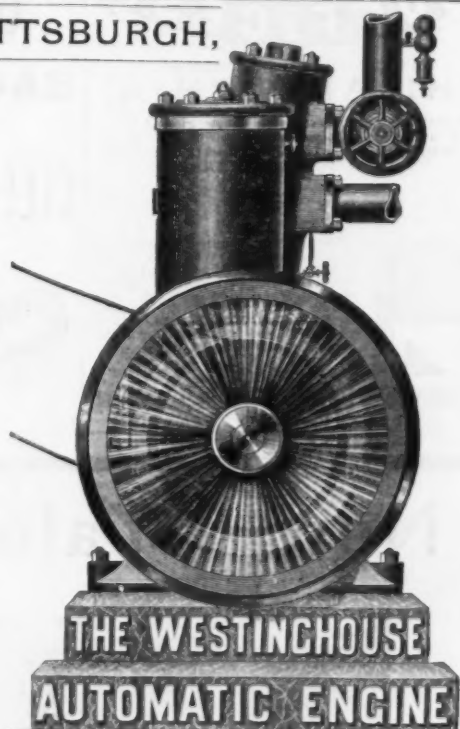
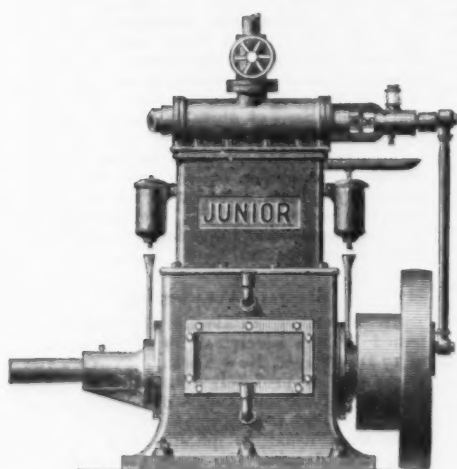
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The First Reduction is now in effect and others will follow as results warrant. All our Latest improvements are in
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Absolute Uniformity of Parts, a Priced Repair List, and 200 Engines always in
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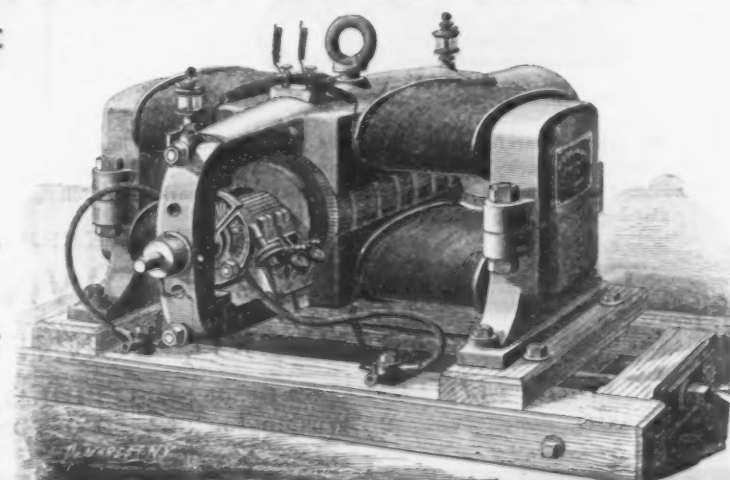
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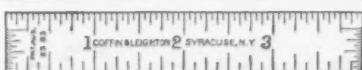
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SCIENTIFIC AND TECHNICAL.

Coefficients of Efflux.

In the October number of the *Journal* of the Franklin Institute Mr. J. P. Frizell directs attention to the well-known fact that the application of a short pipe to a simple orifice in a reservoir results in a material increase of the discharge. "Most writers on hydraulics," says Mr. Frizell, "treat this phenomenon as an ultimate fact of science, to be determined only by experiment. It is, of course, sufficient for practical purposes when this case occurs to be able to make use of the experimental coefficients of efflux. It is greatly conducive, however, to clearness of knowledge to be able to refer this fact to the well-known principles of impact and momentum. Moreover, in hydraulic computations the same phenomenon presents itself in many forms to which no experimental coefficient is applicable. The writers* of the splendid article "Hydro-Mechanics," in the new *Encyclopaedia Britannica*, give their view of the rationale of this phenomenon, and express the coefficient of efflux from a short pipe thus:

$$c = \frac{1}{\sqrt{1 + \left(\frac{1}{\mu} - 1\right)^2}}$$

μ being the coefficient of efflux from a simple orifice, c that from the short pipe. If μ be put = 0.615, this gives $c = 0.85$, which is an approximation to the truth, but too large." Mr. Frizell's reflections on the subject lead to a somewhat different formula, the result obtained by him being, coefficient

$$\text{of efflux} = c = \frac{1}{\sqrt{\frac{1}{\mu} - 2\left(\frac{\phi}{\mu} - 1\right)}}$$

value of ϕ is, according to Weisbach ("Mechanics," &c., Cox, p. 855), 0.975. μ varies slightly with the head. Weisbach takes 0.615 as the working value of μ . Substituting these values in the formula for c , Mr. Frizell finds $c = 0.824$. Weisbach gives 0.815 as the mean experimental value of c , but the values found by different experimenters differ considerably.

Clay as a Water-Proofing Material.

A new mode of treating clay for use as a water-proofing material has, according to the *Builder*, been devised by Mr. Thomas Fraser, of Aberdeen, a gentleman interested in the manufacture of bricks and tiles. It is usual in puddling with clay to prevent the penetration of water to place the clay in trenches, or between rows of sheet piling, in a plastic condition, mixing it first with water and tempering carefully before using. It occurred to Mr. Fraser to test the permeability to water of clay tempered with various proportions of water, and he found that when mixed with all the water that the solid mass would take up the clay was easily penetrated by liquids. It appeared also that as the clay absorbed moisture it increased in volume, and he reasoned from this that conversely if the volume were prevented from increasing absorption would be restricted, and the clay might be maintained with certainty at such a point of moisture as to have its maximum resistance to penetration by water. In order to accomplish this result it would only be necessary to put the clay in place in the form of fine dry powder, packed in so tightly as to be incapable of absorbing more than a certain percentage of water. In practice Mr. Fraser proposes to reduce the clay to very fine powder and pack it into trenches in the ordinary way. So treated it is found when the water is allowed to reach it to absorb about 35 per cent. of its weight, but the expansion due to this compresses the mass so much that it remains impenetrable.

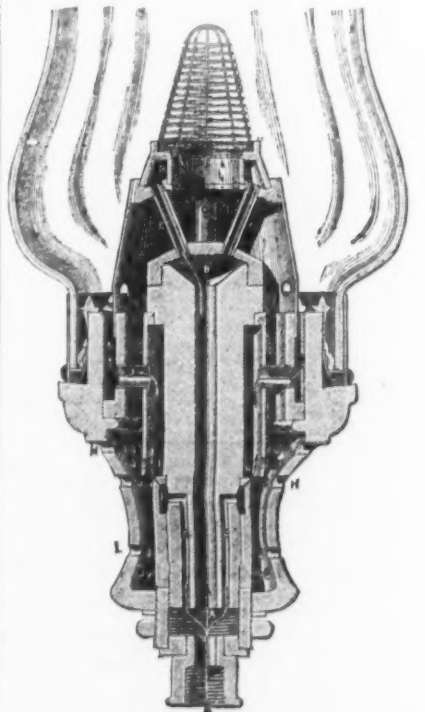
Surveying by Electric Light.

Mr. Otto Chrismar, a professor at Schemnitz, in Hungary, has applied the incandescent lamp as fed by accumulators to facilitate surveying operations in ill-lighted mines, by means of the theodolite or level. A magnetic compass might, of course, be influenced by the currents. Engineering thus describes the arrangement: Two lamps are employed, one large to light the angle to be taken, and a miniature one to light the vernier. We need not enter into the details of these lamps or of the accumulators and the connections, but it may be mentioned that two separate accumulators are employed, both portable. One of these goes along with the larger lamp, and the other with the smaller lamp and instrument. While upon this subject we may add that a French engineer recently made an equally interesting application of the incandescent lamp to a boring appliance. Some time ago an underground gallery closed in and some miners were entombed. In order to ascertain their fate, if possible, and see what had taken place in the cavity where they were, a set of incandescent lamps were designed so as to go down into the cavity along with a bore rod from above. Besides these lamps a photographic apparatus also accompanied the rod. Conductors carried the current inside the hollow rod, and the lamps and camera were operated from above. The result was some photographs of the interior, showing the debris of the cavity, and among it the dead body of a miner partially buried in the earth.

The Clamond Gas Burner.

One of our English exchanges publishes the following illustrated description of the

Clamond Gas Burner, which has been considerably altered and improved since its introduction a few years ago. In this burner, which is a French invention, the light is produced by burning ordinary coal gas within a basket of magnesia, which is thereby brought to a high state of incandescence, and from which a white steady light is radiated. It may be said to consist of three different parts. The first and inner part is a central column, B, of fire proof material. The second part consists of two concentric cylinders placed round the inner column and communicating one with the other through the cross-cuts J. The third part is a china cup inclosing the other parts and perforated with a number of holes. The gas burns in two different places. From A it passes directly through B, at the top of which it branches off through tubes to an annular chamber, D, from which it escapes through the openings $a a a$, where combustion takes place. The other combustion occurs within the circular space G I between the central column and the inner of the two surrounding cylinders. Through two channels, E E, in the lower part of the central column the gas passes into a circular chamber, F F, and escapes through small holes in the upper partition of this chamber, where it burns. The product of this combustion passes out into K through the cross-cuts J. The air entering through the holes H L of the outer china cup passes along the inner of the two concentric cylinders, which is heated to redness, and rises highly heated toward the upper annular burner, where the gas burns at $a a a$ in small separate flames, each entirely surrounded by the hot air. This insures perfect combustion of the gas within the basket of magnesia placed above, and which is thus brought to a state of incandescence. It is claimed for the light produced that it will stand comparison with the electric light. Like that, it shows colors

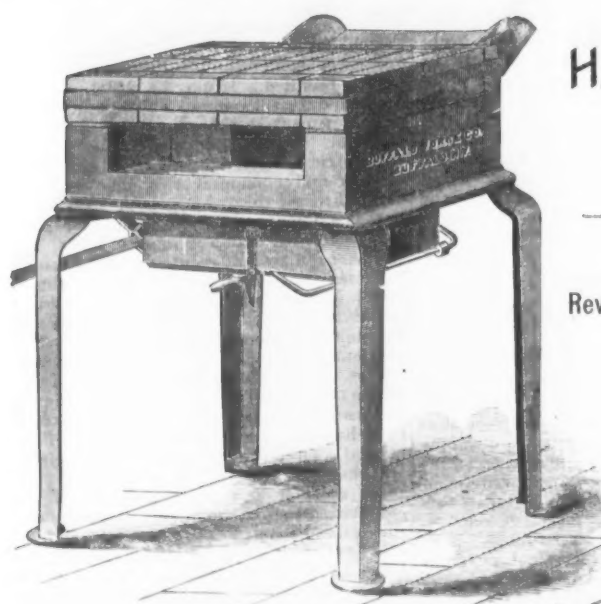


Sectional View of the Clamond Gas Burner.

perfectly true, and will enable an observer to distinguish between the most delicate shades, allowing of the finest work being executed as by daylight. It is, moreover, stated to be perfectly steady. As the Clamond burner can be fixed to any gas bracket or lamp now in use, its adoption causes no other expense than the cost of the burner itself. There is no expensive installation, and, when used in combination with the electric light, it is claimed that a uniform lighting will be obtainable instead of the unpleasant contrast between gas and electricity. Another important advantage obtained by the Clamond burner is the saving effected in the consumption of gas as compared with the same power of light obtained from ordinary burners. The English agent for this burner is F. A. Holst, 42 Upper Thames street, London.

Seacoast and Harbor Defenses.—A letter was presented from Joseph Nimmo, Jr., addressed to the Chamber of Commerce and other commercial and financial associations of New York, on the subject of seacoast defenses, with especial reference to New York City and that portion of our shores the defense of which would naturally be included in any well-devised scheme for its defense. It is stated by the Board on Fortifications, in their recent report, that Long Island Sound is perfectly defensible at its eastern end. The exact language employed is this: "Plum Island and Gull Islands would, if fortified, command the eastern entrance to the Sound." The Coast Survey hydrographic chart clearly indicates this. The available channel for armored ships, known as "The Race," is only 3½ miles wide, with "Valiant Rock" midway in the passage. Steel guns capable of throwing steel shot weighing 1800 pounds a distance of from 8 to 11 miles, if placed here behind impregnable armored forts, with the accuracy of aim attainable only on the land, would have the requisite power to crush the turrets of any armored ship now afloat. At the same time the decks of an enemy's ships might be exposed to a shower of shot and shell from rifled mortars. Submarine mines could also be massed at this point and the defense made so formidable that no fleet in the world would ever attempt the passage. By the means just described the shore of Connecticut and the north shore of Long Island, as well as New York City, would be fully protected. Of course the most formidable and expensive defensive works of New York City will be at the Sandy Hook entrance. The nature and location of works has not, Mr. Nimmo thinks, been determined by our military engineers. The subject was referred to the Committee on Harbor and Shipping to consider and report.

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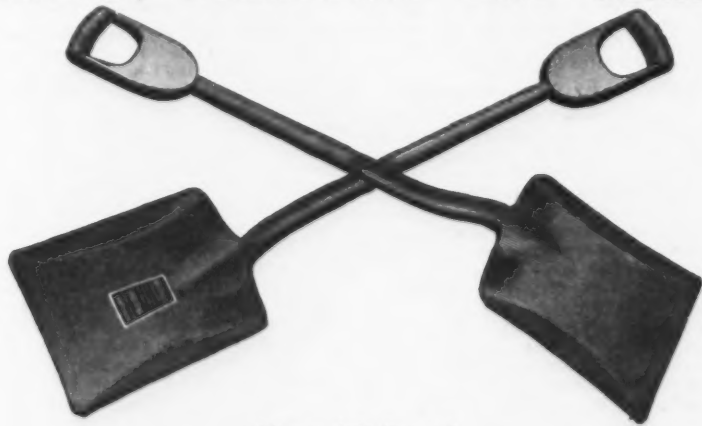
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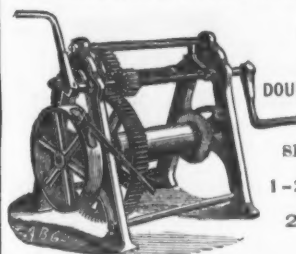
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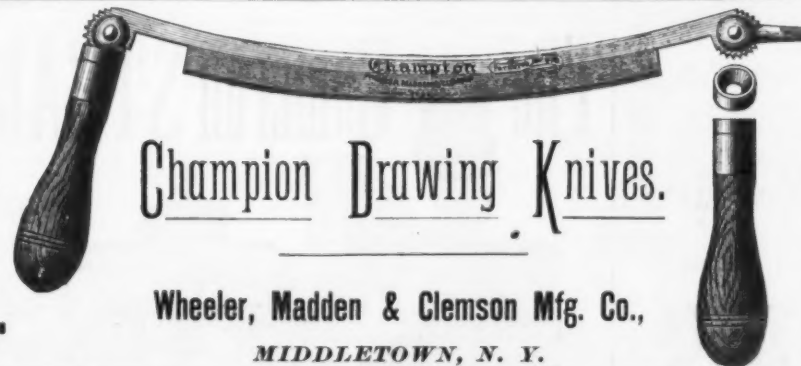
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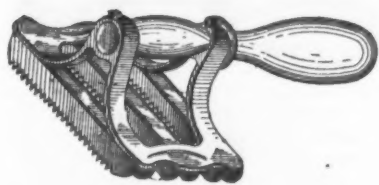
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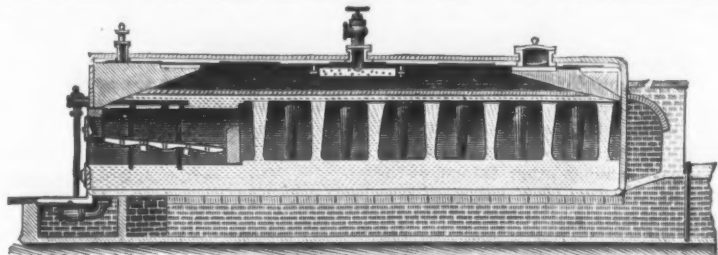


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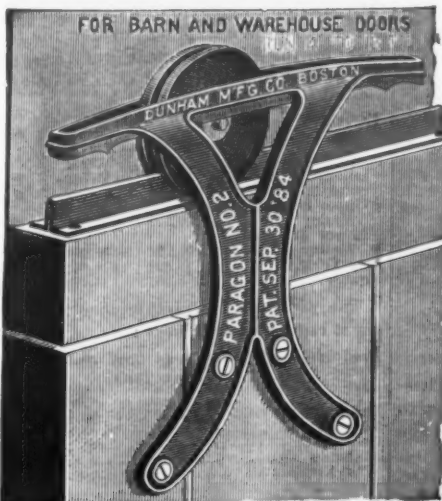
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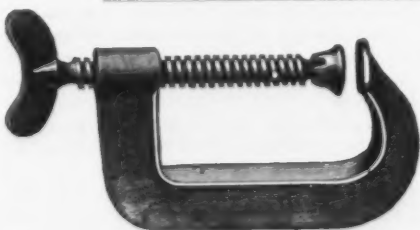
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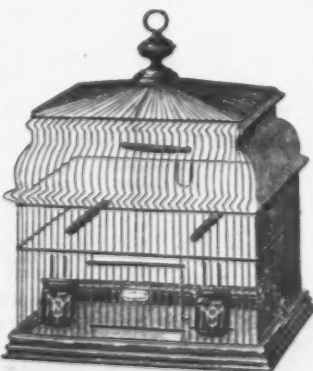
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The Responsibility of Mine Operators
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The case of the Pennsylvania Coal Company, plaintiffs in error, against J. Gardner Sanderson and Eliza, his wife, in right of the wife, defendants in error, has been finally decided by the Supreme Court, by the reversal of two previous decisions, in a decision for the coal company. The case is of the utmost importance to mining operators, oil operators and all others doing business on the banks of natural watercourses, as well as to all owners of riparian property. The history of the case may be thus briefly stated: In mining anthracite coal it is necessary to keep the mines clear of water, which accumulates in large quantities, and which must be removed either by gravity or by powerful engines and pumps, and must find its escape through the natural watercourses. This water is acidulated with sulphuric acid, and consequently is destructive to iron pipe, kills fish and cattle refuse to drink it. The Pennsylvania Coal Company own a large colliery in Scranton called the Gipsy Grove Works, and the water from this mine is pumped and discharged into a small stream called Meadow Brook, a tributary of the Lackawanna River. In 1863 J. Gardner Sanderson built a handsome residence on Meadow Brook, below the colliery, on which he made a fish pond and provided machinery to force the water into tanks in his house for domestic use. As the operations of the colliery grew and the discharge of mine water increased the water of the brook became so contaminated as to destroy Mr. Sanderson's pipes, kill his fish, and, indeed, became totally unfit for use. He then sued the coal company for damages.

In 1878 the case first went to the Supreme Court and the company were then held liable. Twice since it has been before the Supreme Court and the same decision was affirmed. In February last it again came up from the lower court, and this time the Supreme Court has reversed its former action and given judgment against the Sandersons, and the matter is finally settled. Inasmuch as numerous suits had been brought in the State under the former decisions by riparian owners against mining operators in the anthracite and bituminous coal regions, it became of the utmost importance to the entire mining interests of the State that these decisions should be reversed if possible.

The argument for the mining company was prepared with great care by ex-Governor Henry M. Hoyt and J. M. and W. P. Gest, and the following four legal propositions were laid down:

1. The question is one of vast importance and has never been thoroughly examined and never before decided.
2. The true theory of negligence is that damages resulting to another from the natural and lawful use of his land by the owner thereof are, in the absence of malice or negligence, a wrong without violation of the law.
3. In order to permit the development of natural resources and free prosecution of a lawful business trifling inconveniences must sometimes give way to necessities. The only question here is what constitutes a reasonable use of the watercourse in the prosecution of a lawful business.
4. The mining industry has its particular usages and customs, dictated not only by convenience, but by necessity, and are a part of the very law of nature, and the private interests of the individual must defer to them.

In the decision the court says: "If damages may from time to time be recovered either in the present form or as for a nuisance, punitive sums may be resorted to to prevent repetition or to compel the abatement of the nuisance. Indeed, if the right to damages in such case is admitted, equity may, and under the decisions of this court undoubtedly would, at the suit of any riparian owner take jurisdiction, and upon the ground of a continuous and irreparable injury enjoin the operation of the mine altogether."

The defendants have done nothing to change the water or diminish its purity save what results from the natural use of their own property. The water as it is poured into Meadow Brook is the water which the mine naturally discharges; its impurity arises from natural, not artificial, causes. The mine cannot, of course, be operated elsewhere than where the coal is naturally found, and the discharge is a necessary incident to the mining of it. * * *

The right to mine coal is not a nuisance in itself; it is a right incident to the ownership of coal property, and the owner cannot be held for permitting the natural flow of mine water over his own land into the watercourse. * * *

The defendants were engaged in a perfectly lawful business in which they had made large expenditures, and in which the entire interests of the community were concerned; they were at liberty to carry on that business in the ordinary way, and were not while so doing accountable for the consequences which they could not control."

Chief Justice Mercur and Justices Gordon and Trunkley dissent.

At the annual meeting of the Iron and Steel Institute, recently held in London, Daniel Adamson, of Manchester, was elected president for the ensuing year. President Percy, the retiring officer, delivered an address on the iron and steel making resources of Great Britain and the United States. He showed that the British output of Bessemer steel was constantly decreasing, and he warned his hearers that, if there should be a war or commercial struggle, blind belief in their own supremacy would be dangerous, and that disregard of their antagonist's power would result in disaster.

The decision of the Supreme Court in the store-order case recently delivered in Pittsburgh banishes the long ton in Pennsylvania except where its use is specifically authorized by statute or provided for by express contract. There is a great deal of looseness and variety of custom in the matter of weights and measures in Pennsylvania, notwithstanding the attempt of the Legislature to regulate the whole business. The statute ton is 2000 pounds. By custom 2240 pounds are often rated as the ton, but

the Supreme Court decides in effect that in any contract calling for the delivery of so many tons of iron or other substance a 2000-pound ton is all that can be exacted in law unless the contract calls specifically for a larger ton. A custom at variance with the statute will not be recognized by the courts, and manufacturers, mine operators and business men will do well to take note of this and make their contracts accordingly.

Foreign Markets.

FRANCE.

PARIS, September 29, 1886.—Metals.—Greater animation has ruled in the metal market in this city at an improvement in the market for Spelter. We quote at the close, in francs, per 100 kg.: Copper—Chili Bars, 106.50 @ 110; Ingots and Slabs, 111.25; Best Selected, 112.50; and Pure Corocoro Ore, 110; Tin—Banco, 278.25; Billiton, 277.50; Straits, 273.50; Australian, 275; and English, 269.50; Lead, 32.50 @ 33.25; and Spelter, 35.75 @ 36.25. Iron.—The market here has been quiet and steady at 13.50 for Floor-iron, and 14 Merchant, delivered at La Chapelle; and Old Rails are selling at 7.50. Advice from the Department of the North are not received; there is a lack of orders, including some makers to discharge some hands and others to reduce working hours. The dull season being at hand, more workmen may have to be discharged. This does not, however, apply to the rolling mills, which are in receipt of orders sufficient to keep them going for a couple of months to come. Meanwhile the price of Cast Iron Pipe has been raised from 13 francs to 14 francs. While there is a brisk demand for Rivets, Bolts are neglected. In the Ardenne matters are proceeding satisfactorily, though larger orders would be welcome; prices are steady, but may have to be shaded if orders do not soon increase in volume. The Haute Marne is quiet, but prices have undergone no change. Steel is firmer at 16.50 @ 17. Foundries are more active with the approach of the winter season. St. Etienne is dull and unchanged. Coke, Merchant, at 11.50 @ 13.—*Moniteur des Interets Maternels*.

BELGIUM.

BRUSSELS, September 29, 1886.—Iron.—There has been no essential change in the iron market in Belgium. Prices are more firmly held by the syndicate than the previous week. There were rumors that there had been some shading of syndicate prices by some maker or makers, but they were unfounded; the bad impression made was, therefore, of short duration. We quote Merchant, 10 @ 10.50 francs per 100 kg.; Bessemer, 10, 11.50; @ 12.25; No. 2 Sheets, 12 @ 12.50; No. 3, 14.50; Commercial, 16.50; Thin, 18.50; and No. 4, 21.50. There has been no change in Pig Iron. We quote Luxembourg Forge, 3.80; Charleroi, 3.80 @ 3.50 for Forge and Foundry respectively. The making of Steel Sleepers is now becoming a well-established industry in Belgium after the practical experience made therein by Angleur and Cockerill. Meanwhile general business has been improving in Belgium not only by reason of the good local demand for all leading commodities, but also under the impulse of the advices from abroad. This being the case the repeated attempts in the Coal regions to resuscitate a period of gigantic strikes has failed to influence trade adversely. The elements for a good trade are sound, for they rest on moderate prices and stocks. Coal.—Although the winter demand for Coal has begun to set in gradually, prices have not been raised and are the same they were two months since.—*Moniteur Industriel*.

GERMANY.

HAMBURG, September 29, 1886.—Iron.—In consequence of a good demand in Rheinland Westphalia for Forge and Foundry Pig, Wire Rods and Bar Iron, there is a more confident feeling noticeable in the district. There has been no decided advance yet, but there is a well-founded hope of a speedy general improvement. Spelter has been well sustained since the slight decline in July. Forge Pig is in demand at unaltered figures. Although Forge Pig is more wanted, it cannot be quoted any better than before. It is upheld with some difficulty at current rates. Thomas is decidedly firmer. This is less the case with Bessemer. Luxembourg Forge Pig is still weak; Foundry firmer. Rolling mills are meanwhile quite busy, but do not yet succeed in raising prices. Beams sell with ease at the low figures still prevailing. Boiler Sheets are very active, but at old rates. Export orders have dropped in for Wire Rods, causing greater firmness. Drawn Wire and Wire Nails are flat still. Foundries and machine shops are in receipt of larger commands. In Upper Silesia the orders for Finished Iron have been rapidly on the increase, so that an advance impends, but Pig Iron is as depressed as ever, the supply still being excessive. Metals have been a more lively demand for Lead. Copper and Tin are unaltered. We quote at the close, in marks per 50 kg.: German Lead, 13.50 @ 14; Lake Copper, 55; Tin, 104 @ 106; and Spelter, 14.54 @ 15.—*Borsenhalles*.

HOLLAND.

ROTTERDAM, September 29, 1886.—Tin.—The market during the week has been firm, with sales to arrive of Billiton at 61.50 guilders per 50 kg. Banca, September, is held at 62, and November delivery at 62.12½.—*Koch & Fibberholm*.

SPAIN.

BILBAO, September 29, 1886.—Iron.—The market has been moderately active only. Shipments have been made in good condition, but on a limited scale. Freight has risen slightly, but Ruble remains 6/1 @ 6/3½, and Campanil, 6/3 @ 6/4. Shipments to date, 2,350,175 tons, against 2,516,974 last year. Coal.—Strange to say, a Swedish vessel has just landed at Barcelona a cargo of Australian Coal, although quite near that port there is an abundance of good Coal.—*Revista Minera*.

AUSTRIA.

VIENNA, September 29, 1886.—Iron.—The better feeling in the Austrian iron trade has been fully maintained. Austrian and Hungarian production now being well under control, while iron markets are tending upward, the situation has become a singularly sound one. As at the same time makers are moderate in their views, dealers and consumers take hold of iron with confidence. While this is the case, prices have been improving by degrees. There is a steady, satisfactory business transacting in Austria proper, Bohemia and Hungary. The demand chiefly runs on Merchant Iron. Beams are now 1.20 florins higher than they were six months ago. The demand for Structural Iron has, however, abated somewhat. We quote: Fig. 40 @ 45; Merchant, 25 @ 122.50; Sheets, 140 @ 175; and Beams, 105 @ 110. Metals have been a more lively demand for Lead. Copper and Tin are unaltered. We quote Copper, 53 @ 55; Lead, 17.50; Spelter, 18.50; Tin, 135 @ 136; Antimony, 36; and Quicksilver, 22 florins per 100 kg.—*Austrian Trade Journal*.

CHILI.

VALPARAISO, August 6, 1886.—Copper.—The higher prices which exporters were able to pay in consequence of a declining exchange induce holders to meet the market squarely, leading to sales of 25,700 quintals at 17.15 @ 17.35, free on board. There has been an active demand for special brands for the French market; 17,524½ with 30/ freight equals 238.11/4. Spelter.—Consuming markets reporting greater animation during several days in succession, after a prolonged stagnation; there has been more business done, resulting in sales summing up 758,000 quintals Nitrate at \$3.10 @ \$3.25 for 95.5. Since then we are weaker on less favorable cablegrams, the price closing nominally at \$3.25, which is equal to 2/8 in England. July shipments aggregate 25,000 tons to Europe, and 600 to the United States. There were loading on August 1, 25,000 tons for Europe and 300 for the United States. Charter since July 23 were 25,300 tons for the former and 2700 for the latter. Coal.—A cargo of Newcastle, West Hartley, Steam sold at 2/; Orrell is nominal; Australian, 22/, and Smeltling Coal 24/. Exchange has fluctuated, the tendency being downward, closing at 22½, 90 days' sight on London.—*Weber & Co.*

EAST INDIES.

PERANG, August 31, 1886.—Tin.—The price has gradually improved from \$36.75 to \$37.50, closing firm at \$37.50. Chinese paid the top of the market. Receipts have been 10,000 piculs, of which Europeans took 7000 and Chinese 3000. Total export so far from this port to Europe, 88,550 piculs, of which 27,322 to England, and to the United States, 32,274. Exchange.—Four months' bank, 3/4d.—*Schmidt, Kustermann & Co.*

The Iron Age

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The Law and Order League in St. Louis.

The serious disturbances of the past nine months, resulting from and attendant upon the great railroad and other strikes, have created in St. Louis a feeling of uneasiness demanding organization for the better protection of life and property. This feeling has crystallized in the formation of a Law and Order League, which has issued the following circular:

OFFICE CENTRAL BOARD, LAW AND ORDER LEAGUE, ST. LOUIS, MO.

To the Members of the League, Greeting:

In view of numerous requests for information proceeding from the various chapters as to the proper or proposed relations of the Law and Order League of St. Louis to the political conditions at this present existing, the Central Board counsels the chapters as follows:

The Law and Order League stands organized upon the principle announced in its constitution. It insists upon the enforcement of law. It insists upon the preservation of peace, order and quiet in the community. It insists upon a non-interference by any man, or any set or association of men, with the lawful rights of any other man, or set or association of men. It insists upon the right of every citizen to work or not work as he pleases, and to make and carry into effect such lawful contracts as may be agreeable to himself and other contracting parties. It insists that their fellow-citizens in their various walks of business, whether as employees or proprietors, must and shall be protected in all the rights guaranteed to them by the Constitution and laws of the State, and that men, or associations of men, who violently interfere with these rights are law breakers and rioters who must and shall be crushed out. It presents an uncompromising and united antagonism to riotous or anarchical demonstrations, to all forms of boycotting, and to the use of all unlawful and violent means to rectify supposed personal wrongs.

It insists that all political parties shall nominate for offices of public trust men of character, capacity and integrity, and to such only will we give our suffrages. It insists that bad men, whether rioters, anarchists, public plunderers, political ringsters, sympathizers with turbulence and turbulent elements, men who pander to vicious or venal voters, bad and incompetent men generally, shall be defeated at the primaries and at the polls, irrespective of their party connections or preferred connections.

It insists that every citizen is in duty bound to faithfully discharge the duties devolved upon him as such, especially in his participation in the work of primary meetings, nominating conventions and elections. It insists that no man can neglect these duties or shift them upon his fellows without doing violence to his honor and patriotism. It insists that all judges, prosecuting attorneys, grand and petit jurors, shall do their whole duty without fear or favor, and that in so doing they will have the unwavering support of this League. It insists that all public officers shall be administered solely for the public good, and that they shall not be used for political advancement or private gain. It insists that all law-abiding and patriotic citizens of the community should associate themselves together and aid in carrying into practical effect the enunciations of this League. These are the organic principles of the Law and Order League. To them every member stands pledged with their time, energy and means, and around the mail good citizens of all shades of political or religious creed can rally as around the flag of our common country.

No honest man, under the obligations of this League, can countenance any political candidate

who is in sympathy with any associations or practices which are hostile to the foregoing declarations. The League reposes in the judgment of its members as to how they should act in individual cases. The influences of the League are intended to be, and are, in fact, in harmony with its declarations. But to assume a position as a political party, or to dictate to the individual judgment of its members as to what is right or wrong, or to in any wise limit the personal freedom in the exercise of the elective franchise, is, in the opinion of the Central Board, neither wise nor in harmony with our declared principles. Counting among its members men of all shades of opinion on party matters, the Law and Order League is concrete and a unit by virtue of its principles, which are above all parties and interfere with the proper functions of none, so long as they operate within the limitations of law. If the future should bring about a marshaling together of anarchical or law breaking or boycotting elements for the purpose of measuring political strength with the patriotic people of the community or country, a united political action by the League as such might in such an issue be advisable. Sufficient unto the day is the evil thereof.

No work ever undertaken in this community is more important as bearing upon its peace and prosperity than the work of the Law and Order League. Give to the world the assurance that here labor and capital, which are mutually dependent upon each other and essentially the same, are fully protected; that public trusts are administered for the public good; that taxation is at a minimum; that all rights of life, liberty and property are safe not only by reason of law, but by reason of a living active public sympathy that will not brook their infraction; that enterprises of all kinds can be safely entered upon, because every opportunity for success will be offered, and immediately the stream of immigration that is spreading over the great West will flow to St. Louis as surely as the magnet turns to its pole. These are the things that are needed more than your great river, or your iron mountain, or your mines of mineral and ore. Capital and brains and muscle made out of sea marshes a great commercial Holland, and they will always gravitate to the place where they can operate with safety. What, then, are the immediate duties of the members of the League? Register, vote, and see to it that not only you who are Leaguers, but that your neighbors also, do both. The League can safely trust the individual conscience of its members to do that which is right, and as becometh a good and patriotic citizen.

By order of CENTRAL BOARD, L. O. L.

We do not know enough of the movement behind this proclamation to be sure whether its real object is expressed or must be found by "reading between the lines." So far as the circular is concerned, the declarations are such as any law-abiding, self-respecting citizen can heartily subscribe to. St. Louis has certainly suffered heavily in wealth and reputation from the outrages committed in the name of labor, from bad government and from the consequences of the neglect by the better class of its citizens of the arduous and often unpleasant political duties of the primary and the nominating convention. The ground lost can only be recovered in St. Louis, as it was in New York after the carnival of corruption presided over by the Tweed ring, by a spontaneous uprising of the people and the vigorous enforcement of the law against law breakers and official criminals. To this extent the movement in St. Louis is entitled to the sympathy and support of all good citizens.

So far as it touches the operations of organized labor, it needs judicious management by cool-headed, patient, moderate men. Labor has been led far astray in some instances, but it cannot be driven back with clubs to safe ground. It must be led back, by the hand, as it were, and that is possible only when undertaken by those in whom it has confidence. If any hot-headed and unreasonable men in the League shall by word or act create the impression that the movement is antagonistic to organized labor and seeks to oppose it with hostile influences, the resulting conflict is likely to be disastrous to both sides, and no good will come of it. Boycotts, riots, assaults, murders and the destruction of property are no part of the effort of honest labor to better its condition. In their suppression the help of honest labor can be secured, for it is inconceivable that the great mass of workingmen in this country are voluntarily submissive to the tyranny of those who are bringing the labor movement into hostility to society and the institutions of civilization. The St. Louis Law and Order League can accomplish great results if it will set about its work in the right way and not undertake to suppress organized labor—a task as impossible of accomplishment as an effort to bind the Mississippi in its banks with threads of spool cotton. Wise men are not antagonizing organized labor. They are going with it, and seeking to lead it by safe paths to practicable and desirable ends, to counteract the mischievous teachings of half-educated demagogues, and to help the honest and industrious workingmen to attain everything which is for his good. Organized labor is not nearly so unreasonable as it often seems to be. It needs wise and prudent leadership, and this it can get only from the classes which have risen above the wage-earning level. They will respect and follow such leadership in council, and the best elements of organized labor desire it.

It is a matter of some interest to note that the peculiarities of drop-press work have received attention only in a very general way, and may yet be studied with a fair promise of valuable results. Every one who has had experience in the use of drop presses knows that, contrary to what might be expected, there is an important difference between the effect produced by a light weight falling a long distance and that due to a heavy weight falling a shorter distance, some kinds of work requiring one form of hammer and other kinds another, and yet the total energy developed in the two cases may be exactly equal. Evidently the spaces passed over and the

weights of the falling bodies are not the only elements to be considered; time and speed of working should also be taken into account. In addition we have to deal with the function of the anvil, which, in the commercial way of designing hammers, is generally and unfortunately overlooked to a very great extent. Sharp competition and the consequent growing necessity of supplying machinery at a low price has led to a disregard of the importance of some features of construction, and, among other things, of the fact that the effectiveness of hammer blows may be very much changed by increasing or decreasing the weights of anvils. So far, however, as this particular point is concerned, little difficulty should be experienced in applying a remedy. The main things to be considered are the relative merits of long and short drops of light and heavy hammer heads for different kinds of work, and a careful investigation would undoubtedly bring forth results of great practical and scientific value.

Condition of the Blast Furnaces of the United States, October 1, 1886.

During the month of September and thus far this month the pig-iron markets in all parts of the country have gained steadily in strength, and yet it cannot be said that there has been any pronounced movement in the direction of a resumption of work among idle furnace plants. There have been the usual changes due to the blowing out for repairs on the part of some stacks and the relighting of the fires in others after relining. We have revised our lists, adopting that recently published by the American Iron and Steel Association. This has led to the dropping of a few furnaces out of the ranks of possibly active plants, the majority of those long idle having been stricken out of that category. Some furnaces are idle because their owners are carrying out plans of improvement; others recently equipped with modern appliances have just gone into blast, and others again have entered the list of active producers after a long period of inactivity. Then there are quite a number of stacks now under construction, so that on the whole the tendency is toward a larger make. But no one who goes carefully over the list of existing plants can, we believe, fail to be impressed with the fact, that however great the nominal reserve capacity may be, the actual equipment available for production is small, comparatively speaking, and can only be brought out by a very material rise in prices. This is notably the case with the bituminous coal and coke furnaces, but holds good, too, so far as the anthracite furnaces are concerned. We are inclined to the belief that not more than 20 per cent. of the capacity of idle furnaces, if indeed as much, could become available for production even under the stimulus of a marked advance. That is to say, the weekly capacity is not likely to reach 40,000 tons with the anthracite furnaces, or 75,000 tons for the coke furnaces, except very gradually, since it takes time to get plants long idle into anything like a working condition.

Anthracite Furnaces in Blast September 1.

Location of furnaces.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
New York.....	30	12	4,246	18	4,338
New Jersey.....	15	8	2,708	7	1,011
Spiegel.....	8	3	925	5	0
Pennsylvania:					
Lehigh Valley.....	47	35	11,578	12	3,056
Spiegel.....	1	0	0	1	40
Schuylkill Valley.....	44	30	6,636	14	4,513
Spiegel.....	1	1	150	0	0
U. Susquehanna Val.....	18	9	3,134	9	2,297
L. Susquehanna Val.....	36	24	7,626	12	2,280
Maryland.....	4	2	449	2	135
Total Sept. 1.....	199	114	35,819	85	17,630

As compared with former months we have:

Date.	Furnaces in blast.	Capacity per week.
October 1.....	114	35,819
September 1.....	112	33,307
August 1.....	130	36,841
July 1.....	117	36,792
June 1.....	121	38,239
May 1.....	119	36,924

Reviewing the different districts in detail we may state that no special changes have taken place in New York. In New Jersey the Chester Furnace blew in again, and somewhat erroneous accounts have been published concerning the manner in which it was done. Mr. Taylor informs us that hot air was driven into the furnace first, the oven having been fired with wood for two days. After blowing for about one hour the wood in the furnace ignited, the blast having a temperature of 525° F. heat, and not 340°, as reported. Mr. Taylor adds that it is supposed to be the first time that a furnace was ever let in in this way. With the Chester and the Pequest furnaces again in blast the New Jersey output will now reach its normal condition. In the Lehigh Valley the Lehigh Zinc Company's spiegel furnace blew out on the 27th ult., but otherwise there have been no changes. Three or four stacks, however, are being relined, some of which may be ready during the current month. In the Schuylkill Valley report we have segregated the Lucinda from the rest, it being now run on spiegelolite. Among the furnaces out of blast there are eight controlled by the Philadelphia and Reading Coal and Iron Company. In the Upper Susquehanna district the Duncannon

Furnace will probably go in during the current month. The Bloom is being modernized. The Irondale was hampered during September by low water, but is again running up to capacity. In the Lower Susquehanna Valley No. 1 of the Pennsylvania Steel Company will go in as soon as repairs now being carried out are completed.

The following is the status of the bituminous and coke furnaces:

Bituminous or Coke Furnaces in Blast, October 1, 1886.

Location of furnaces.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
Pennsylvania:					
Pittsburgh.....	16	15	14,635	1	500
Spiegel.....	1	1	430	0	0
Allegheny Valley.....	2	1	449	1	115
Shenango Valley.....	23	14	6,910	9	8,065
Youghiogheny Valley.....	6	3	1,014	3	855
Junata & Conemaugh.....	20	12	4,837	8	2,632
Spiegel.....	1	1	230	0	0
Maryland.....	1	1	130	1	90
Virginia.....	10	7	3,390	3	975
West Virginia.....	6	4	1,622	2	730
Ohio:					
Mahoning Valley.....	15	8	4,972	7	3,560
Hocking Valley.....	10	6	1,071	4	1,350
Hanging Rock.....	12	11	2,274	1	80
Miscellaneous.....	18	15	8,547	3	1,075
Kentucky.....	8	3	896	5	0
Tennessee.....	10	7	2,712	3	1,025
Georgia.....	10	2	1,015	8	0
Alabama.....	10	8	3,353	2	560
Indiana.....	2	1	125	1	210
Illinois.....	16	11	9,984	5	1,690
Michigan.....	0	0	0	0	380
Missouri.....	3	3	911	0	1,975
Wisconsin.....	3	1	675	2	850
Colorado.....	1	1	600	0	0
Total Oct. 1.....	204	136	70,802	68	22,497

As compared with former months we have:

Date.	Furnaces in blast.	Capacity per week.
October 1.....	136	70,802
September 1.....	135	69,206
August 1.....	133	68,852
July 1.....	132	71,316
June 1.....	129	70,766
May 1.....	129	67,888

No changes have taken place in the Pittsburgh district, which is still working up to full capacity. In the Shenango Valley the Henderson Furnace started on September 14, and the furnace of Messrs. Raney & Berger and the Etna were not producing for a brief period during the month. Everything has remained unchanged in the Allegheny and Youghiogheny valleys, and it need only be noted that Oliphant Furnace will probably go into blast some time this month. In the Juniata and Conemaugh valleys the Emma is again in blast, and the Rockhill Furnace was running with only half the power of its engine, thus somewhat reducing its make.

In Virginia one of the Longdale furnaces went out on the 13th of September, but is expected to resume operations on the 13th of the current month. The Gem blew in on the 20th, and has therefore only reached full work during the current month. The output of the Princess Furnace is limited by its boiler capacity. In West Virginia the Irondale was stopped for one week by a breakage of its engine. In Tennessee full work was cut short by the scarcity of coke at the Clitico Furnace and an idleness of No. 2 Rockwood. In Alabama the Sloss lost 10 days. In the Mahoning Valley, Ohio, the Mary Furnace went out on the 12th of September to reline, thus further reducing the current make of that section. In Indiana the Vigo Furnace blew in again on the 1st inst., while in Illinois the Calumet Furnace was lighted on the 2d. The South Chicago furnaces lost two days, which, with their heavy product, represents almost the make of a small furnace for an entire month. The three Union furnaces, although they have now been in for about nine months, are keeping up a heavy product.

The following is the status of the charcoal furnaces:

Charcoal Furnaces of the United States, October 1, 1886.

Location of furnaces.	Total number of furnaces.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
New England.....	14	5	540	9	404
New York.....	9	3	391	6	361
Pennsylvania.....	25	6	442	19	470
Maryland.....	1	1	100	0	750
Virginia.....	23	14	714	9	480
North Carolina.....	2	1	130	1	190
West Virginia.....	0	0	0	3	165
Ohio.....	17	6	490	11	560
Tennessee.....	3	2	305	1	110
Georgia.....	10	7	1,491	3	360
Alabama.....	25	15	4,997	10	2,135
Michigan.....	11	3	682	8	725
Minnesota.....	1	0	0	1	210
Missouri.....	4	1	210	3	690
Texas.....	2	1	230	1	110
California.....	1	0	0	1	345
Washington Territory.....	1	0	0	1	175
Oregon.....	1	0	0	1	100
Total, Oct. 1.....	173	68	10,292	105	8,622

As compared with former months this is:

Date.	Furnaces in blast.	Capacity per week.
October 1.....	68	10,292
September 1.....	63	10,797
August 1.....	61	9,725
July 1.....	61	9,885
June 1.....	61	9,867
May 1.....	45	8,211

There has been no change of any importance among the charcoal furnaces of New England and New York. The Kent Furnace will go in probably on the 1st of November, and the same date is fixed for the Chatham, in New York. The Eagle Furnace was to blow in on the 5th or 6th of the current month, and the Pine Grove Furnace lost one week in September repairing its oven. The

Isabella made no iron in September, and the product of the Oley was smaller than usual. It will be observed that only one of the Maryland furnaces is running, while there has been a very large increase in the number of furnaces which are making a campaign in Virginia.

In Kentucky the Hunnewell Furnace was in blast only 18 days in September, and the product did not, therefore, come up to its monthly average. In Alabama the furnace at Jenifer was out in September. The other furnace of the Clifton company, the two Shelby furnaces, the Tecumseh and the Woodstock, made together in that month 5291 tons. In Tennessee the Cumberland, La Grange and Warren furnaces together produced 2602 tons in September. In the Northwest there has been little change. We estimate the make of the 15 furnaces running in Michigan at 17,823 gross tons.

We estimate the actual product for nine months of the current year as follows:

Production of Anthracite Pig Iron, Nine Months, Gross Tons.

Pennsylvania:	435,815
Lehigh Valley.....	230,729
Schuylkill Valley.....	108,788
Upper Susquehanna Valley.....	319,151
Lower Susquehanna Valley.....	150,487
New Jersey.....	101,495

By way of comparison we have computed the average monthly output for the year 1885, for the first six months of 1886, and for the first nine months of 1886, as follows:

Average Monthly Output.

	Year, 1885.	Six months, 1886.	Nine months, 1886.
Pennsylvania:	35,117	47,701	48,424
Lehigh Valley.....	15,341	25,549	27,081
Schuylkill Valley.....	9,570	12,584	12,097
Upper Susquehanna Valley.....	31,532	36,314	35,401
Lower Susquehanna Valley.....	10,824	16,641	16,721
New Jersey.....	5,481	11,773	11,277

The production of bituminous and coke pig is estimated as follows:

Production of Bituminous Coal and Coke Pig Iron—Gross Tons.

Pennsylvania.....	981,564
Virginia.....	36,594
Georgia.....	32,027
Alabama.....	133,647
West Virginia.....	27,339
Kentucky.....	61,062
Tennessee.....	109,945
Ohio.....	591,357
Illinois.....	303,578
Missouri.....	32,974

Adopting the same system of average monthly product we have:

Average Monthly Output.

	Year.	Six months.	Nine months.
	1885.	1886.	1886.
Pennsylvania.....	89,144	106,196	108,952
Virginia.....	11,245	10,219	10,947
Georgia.....	2,019	3,308	3,538
Alabama.....	11,151	16,145	14,840
West Virginia.....	5,134	7,433	7,121
Kentucky.....	2,444	2,681	3,097
Tennessee.....	9,672	12,611	12,216
Ohio.....	59,577	63,564	65,706
Illinois.....	34,403	29,111	33,731
Missouri.....	2,304	3,434	3,663

are some of a different tenor. The newspaper mentioned carefully avoids even that, and reaches the conclusion that the evidence completely upsets the conclusions reached by Robert P. Porter in his trips through the industrial regions of Great Britain and the Continent.

Let us analyze the evidence. Out of the 18 foreign-born men, one miner says that he was better off from 1852 to 1869 in Durham, England, than he is here, and a second one who was at work in Scotland from 1851 to 1868 is of the same opinion. A third, who was a miner in Northumberland, states that for a number of years his condition was decidedly better. He adds: "As proof I will state that six years since I came to this country with my wife and five children and had money enough left to purchase all necessities, but to-day, were I to sell off everything I am possessed of, I could not pay off the debts I owe, much less pay our way back to Europe." Another reports that he worked up to his 18th year in Scotland, but confesses that he can say nothing in regard to comparison, "but would say that he has never experienced such uneasiness in his life as at present in trying to procure the necessities of life." Another, a Scottish miner, "never was in lower circumstances than at present." One man reports: "The first three years I was here I did well and made money; the fourth year, just about made both ends meet; last year, gone to the bad about \$200." On the other hand, quite a number of men believe that their condition is about the same, in some respects being better, in others worse. One says: "Comparing conditions in both Wales and America, I would decide in favor of America," and there are others who express the same opinion. Another report is as follows: "Wages in Scotland are smaller than here, but constant work renders men as comfortable and contented. Their provisions are coarser; they have less delicacies. On the whole I believe they are more contented."

Meager as it is, the evidence is by no means uniformly favorable to the claim which Mr. George and the *Evening Post* are trying to establish. There is one point which both writers, curiously enough, forget entirely to take into account. In looking over the returns, wherever it can be traced, it will be found that the men left their native country a number of years ago, and that one of them is comparing his condition to day in this country with what it was at a former time, dating back from five to 15 years. Not one of them furnishes evidence which would admit of comparison at the same time or reasonably proximate periods. Now it is well known that the coal trade of Great Britain has had periods of great prosperity, and naturally those who are now suffering from the long-continued depression, which reached its climax in 1885 or early in 1886, when they wrote, take a gloomy view of their surroundings and think regretfully of the past in the "old country." No one who has followed the course of events in Great Britain during the past two or three years can doubt that if they could compare their present condition with that of their fellows whom they left behind them the evidence would be quite different. Even if it were just to draw any general conclusions from the survey reports printed by the Pennsylvania Bureau of Statistics—and we emphatically pronounce them valueless as evidence—they must be rejected because they attempt to draw comparisons between the condition of men at very different times. As for the reports from ironworkers, there are only four from men who formerly worked abroad, and not one of them claims that he is worse off, while others confess that they are doing better. To claim on the basis of such "facts" that the condition of labor in Europe is even approximately equal to that in this country is a monstrous distortion of the truth.

The Coal-Waste Question.

Since natural gas has come into extensive use, and has demonstrated practically in numberless ways that its advantages as compared with solid fuels are of a high order, renewed attention has been given to the employment of gaseous fuel for all industrial purposes. That in the study of this subject the question of coal waste should figure prominently is only natural, and shows an appreciation of the possible use that can be made of the enormous quantities of culm which have already accumulated in the coal regions and which are constantly being added to year after year. Of recent publications bearing on the matter, the report of the Scranton (Pa.) Board of Trade, issued a short time ago, will be found specially interesting. It is devoted mainly to a consideration of the manufacture of water-gas fuel from these extensive deposits of anthracite slack, and supplies facts and figures which, though suggesting the desirability of further confirmation, should not be passed over lightly. The principal question to be disposed of in using artificial gas as a heating agent has always been that of cost, and, while there has been little doubt that it could be answered to the entire satisfaction of all prospective users, definite figures have always been given only with a good deal of hesitation. In the report before us, however, the matter is approached boldly and is treated in a manner which must satisfy even the most enthusiastic supporter of any artificial gas fuel project.

Starting with Prof. T. S. C. Lowe's statement that from 50,000 to 100,000 cubic feet of water gas can be produced from a ton of coal, the report figures the cost of production as follows:

One ton of waste at producer.....	\$0.50
Labor handling same per ton.....	0.30
Expenses of plant per ton.....	1.00
100,000 cubic feet.....	\$1.80

In other words, then, taking the maximum gas capacity of a ton of coal, the cost of the gas would be less than 2 cents per 1000 cubic feet. With an estimated volume of waste output of 2,000,000 tons per annum there would further be an available yearly supply of gas of 200,000 million cubic feet. Granting that this may be somewhat overdrawn, it still must be admitted that, with all the possible shortcomings of the culm as a serviceable gas-producing material, it may be profitably turned to account in this way. Using it directly under boilers for steam raising has been tried in different places with varying success, but, undoubtedly, not with that degree of satisfaction which its previous conversion into a more convenient and easily-managed form would have entailed. Any effort, therefore, which is made to develop the methods of water-gas fuel manufacture with coal slack as a raw material should meet with hearty encouragement. Progress is constantly being made, and, while we do not share to the fullest extent the sanguine expectations set forth in the report to which we have alluded, a comparatively satisfactory solution of the problem should not be beyond early attainment.

The Duty on Foreign Iron Ore.

To the Editor of *The Iron Age*.—DEAR SIR: You have an article in your issue of October 7 on the subject of an appeal now before Acting Secretary Fairchild, with regard to the method of levying duty on imported iron ore. You state in that article that the Bethlehem Iron Company and Pennsylvania Steel Company are interested in the decision as importers of iron ore from their mines in Cuba. They are not interested in this matter in the slightest degree, although they are interested in the mines in Cuba, because the average per cent. of moisture in the Cuban ore does not exceed 1/4 of 1 per cent., and therefore its effect upon the duty is inappreciable.

You state that in this country iron ore is bought and sold by the ton, gross weight, moisture and all, the agreements generally specifying the given minimum or range of metallic iron. If you will take the trouble to analyze this statement you will find that the moisture in this instance is taken off the analysis, while in the foreign ore the moisture is taken off the weight—the very same identical thing, only expressed by another name. If you will kindly figure for yourself a little invoice on 100 tons of 50 per cent. iron ore at 10 cents a unit, which contains 10 per cent. of moisture, you will find that it comes to \$450, whether you take the 10 per cent. off the weight or take the 10 per cent. from the analyses. Of course you understand that any guarantee of minimum contents of metallic iron in a native ore is based upon natural condition as received, and not the ore dried at 212°. In other words, the American miner takes the moisture off the weight, only he does not know he is doing it, because he calls it by another name. Yours truly, ALFRED EARNSHAW.

The point at issue in the question raised concerning the definition of what a ton of iron ore is understood to be in this country is not what the buyer pays for. Mr. Earnshaw puts the difference tersely when he says that the moisture is taken off the analysis in dealings in domestic ore, while it is taken off the weight in the purchase and sale of foreign ore. The point which is to be decided in the case pending before the Acting Treasurer is whether the duty is to be levied on the gross weight as received, thus accepting as the definition of what "a ton of iron ore" is that based upon common usage in this country, or whether the duty is to be levied upon the gross weight, deducting moisture. The latter is claimed by the importers because they happen to figure the selling value of an iron in a somewhat different manner than is general in this country. That both methods of getting at the value of the iron lead to the identical result is so plain that we did not think it necessary to allude to the matter, nor did we believe it possible that our readers could have any doubts on that point or construe our remarks in that manner. Importers claim that it is unjust and ridiculous that they should be forced to pay a duty on water. The same objection might be made to paying freight on water. The issue is to decide what in the eye of the law is a ton of iron ore. We deny that a particular way of figuring out the value of the ore on the part of the importers entitles them to override common usage in the trade in this country, with the object of obtaining a lower rate of duty.

At a meeting of the Board of Directors of the Berlin Iron Bridge Company, of East Berlin, Conn., the following relative to the death of Mr. Samuel C. Wilcox, president, was spread upon the minutes: "Hon. Samuel C. Wilcox, president of this company, having died at his home in Berlin on the 21st day of September, 1886, we, the directors of the Berlin Bridge Company, place on record this testimonial of our appreciation of his services, our respect for his memory and our sense of loss at his death. Mr. Wilcox was for many years president of this company. In that position his labors were distinguished by ability and fidelity; his devotion to his duties was untiring, and our recognition of the obligations of this company would fall short of what the truth

required unless we should also record, as we gratefully do, that when his personal support and personal credit meant nearly everything to this company they were never asked in vain or found wanting in any emergency. We think it proper also to record our sense of Mr. Wilcox's worth in other capacities than his immediate connection with this business. As a manufacturer he was identified with many of the leading industries of Connecticut, in the conduct of which his wise counsel was sought and acted upon and his executive energies employed; as a public man his business-like management of the finances of the town of Berlin when intrusted to his care was commended by men of all parties, while as a member of the General Assembly he was always alive to the best interests of his town and State; as a private citizen he was distinguished for sound judgment, strict integrity and public spirit and benevolence. Recording this testimonial with a deep sense of the loss which we and this company have sustained, we tender our sympathies to the family of our late associate and direct the secretary to forward them a copy of these resolutions.

The Durability of Iron and Steel Ships.

The substitution of iron for wood as a material for ship construction, says the *Engineer* in a recent issue, has rendered it possible not only to build ships stronger than before, but also to diminish the cost of their production and maintenance. It is fortunate for shipowners in these times of low freights that the repairs of ships due to ordinary wear and tear are not usually so considerable as formerly. Dry-rot and the other forms of decay which were so prolific a source of trouble and expense in the management of wood vessels, are wholly unknown in their iron and steel successors. The loosening of fastenings and other indications of straining which were so commonly exhibited by wooden ships after a few years of hard work are also experiences of the past, and so are the extensive "openings up" which were periodically resorted to in order to establish a vessel's claims to reclassification. The shipwright's bill no longer swallows during a few weeks the earnings of 12 months, unless it be when new decks are wanted, which is not often in the career of any ship. The dry-dock proprietor and the painter are the tradesmen with whom the shipowner has chiefly to reckon nowadays, with an occasional job for the engineer and boiler-maker if his vessel is propelled by steam. The necessity for new boilers is to the steamship owner an ever-existing rock ahead, and wise is he who sets aside an adequate proportion of each year's earnings to pay for the boiler or boilers which will inevitably be wanted should his vessel be fortunate enough to keep afloat until the old ones are worn out.

We are concerned at present, however, with the subject of the durability of the hulls of iron and steel ships, apart from that of the machinery; and although depreciation is ever taking place as the age of a vessel increases, yet, with the exercise of due care, the actual deterioration per annum in the strength and quality of the material in an iron or steel ship may, as many shipowners are aware, be reduced to a very small sum indeed. Wood decks will inevitably wear thin, and wood ceilings become defective; but the iron and steel parts of the vessel, if properly attended to, will require little or no expenditure, except for cleaning and painting, during many years. Oxidation is, in fact, the only source of deterioration which has to be provided against; and if oxidation could be entirely prevented, there does not seem to be any reason why an iron or steel ship should decay at all. It becomes, therefore, an important question to ascertain to what extent the tendency of iron and steel to combine with oxygen may be checked, and in what way that result may be best attained. The experience obtained with existing iron ships is only of a partial and relative character.

There are vessels still in existence which were built of iron 30 to 40 years ago, but when comparing the condition of some of these with that of wooden vessels of the same age one is not very favorably impressed with the durable qualities of the former material. But this is due to ignorance regarding the oxidizing tendencies of iron on the part of those who first owned these vessels, or, if not wholly to ignorance, then certainly to neglect. One fact is very clear. The iron vessels that have been best cared for are now in the best condition, and those which have been neglected are worse than any wooden vessels would be that had not been attacked with dry-rot or other form of decay. From this it would appear that an iron or steel ship, although not liable to serious wasting in the early years of its existence, may yet, if oxidation be permitted to go on, prove to be less durable than a wooden ship. The quality of durability—with which that of maintained strength and seaworthiness is, of course, intimately associated—is therefore not inherent to iron and steel ships, except during a comparatively early part of their existence, before the results of oxidation can become very considerable. If the proper precautionary measures for preventing or arresting oxidation are neglected, there is no reason why an iron ship should last any longer in a serviceable condition than a wooden one. Experience with existing iron vessels, built from 25 to 40 years ago, tends to corroborate these deductions, for some of them are almost as strong and sound as when first built, while others are reduced to the thickness, and therefore strength, of a tin pot.

What, then, are the observed tendencies to oxidation of the several parts of iron and steel ships, and what does experience teach in regard to the best measures for preventing or arresting these tendencies? For many years after vessels were first built of iron it was supposed that the chief wear and tear would take place in the parts below water. The outer surface of the bottom plating was thought to be particularly liable to wasting by oxidation, and so special measures were early adopted for preventing corrosion thereat by the use of paints and compositions. But very soon it was found that, whatever might be the risks of wasting

by corrosion to which the outer surface of the bottom plating was exposed, those of the inside surface were far more considerable, especially at the flat of the bottom, between the deep floors, where there is a continual wash of bilge drainage with every movement of the vessel. This fluid, which consists of condensed moisture from the cargo mixed with drainage from the latter and decomposed organic matter, such as grain, &c., is almost always of an acid character, and its effect upon the iron or steel with which it is in contact is often supplemented by the mechanical action of gravel, pieces of wood or nut and screw bolts which have been negligently permitted to get into the limbers. Hence it was very soon found that the inner surface of the bottom plating, to as high as the turn of the bilge, must be protected from the action of such influences as these, and at first a coating of pitch was employed for the purpose. Asphalt was next tried, but by common consent Portland cement was ultimately adopted as the best preservative of this part of the vessel. There is still, however, a lack of agreement in regard to the paints and compositions best suited for preventing fouling and corrosion on the outer surface. Some shipowners pin their faith to one specific and some to another, but so far it is very doubtful whether anything yet tried can be depended upon to keep a ship's bottom fairly clean during 12 months.

Corrosion has, however, been reduced to a minimum at this part of a vessel, so that it is not unusual to find the bottom of a ship when about 12 years of age completely covered with an enamel-like coating, formed with the many layers of paint which have been applied during that time. But all ships are not alike in this respect, the recently added paint in many cases being merely a covering to a thick incrustation of rust, and sometimes even of cavernous accumulations of rust and water, the presence of which can be discovered only by the aid of a chipping hammer. Unless oxidation is thoroughly removed from iron or steel plating, and the surface is quite dry, it is of no use to apply paint or any composition for preventing corrosion. By bearing this in mind and acting upon it the bottom of an iron or steel ship may prove the most durable part of her. Indeed, upon drilling holes at different parts of the plating of old iron ships it is commonly found that the loss of substance in the bottom is much less than at the topsides, and very often no depreciation at all in thickness can be discovered between the upper part of the bilges and the keel.

In a properly cemented and frequently coated iron or steel ship there will be little or no danger of the outer plating wasting by corrosion on its outside surface, except in the region of the water line, and even at that part the tendency may be minimized by carefully removing the rust formed during each voyage and painting the surface. It is upon the inside surface of the plating, above the height to which cement is laid, that the waste by corrosion chiefly takes place, and it is the top sides of an old iron ship that first come under serious repair and renewal. That the tendency to corrosion should be very considerable at that part is obvious when we consider the influences to which it is exposed. The moisture which evaporates from most cargoes condenses first upon the iron skin, which is kept cool by the sea, and thence it trickles into the limbers. This moisture at once attacks any exposed surface of iron, and yields to the latter a large portion of its oxygen. If the surface is painted the water is unable to do any mischief, nor will corrosion take place so long as the paint endures. But in the course of time moisture gets between the paint and the iron, rust is formed, the paint is thrown off, and conditions are set up that are calculated to speedily depreciate the substance of the plating unless they are arrested. When the ship arrives in port and the cargo is discharged this matter should be at once looked to, and if cleaning and repainting are found to be necessary they should be carried out at once. But in these days of hurry and rush one cargo is scarcely out before another one is being put in, and thus ships are often kept running for years without a brush of paint being applied to the inside surface of the side plating. When the paint is put on too often it is laid upon the rust, and so might just as well have been kept in the paint store. Sailing ships are usually better attended to in this respect than steamers, and this is due to their not being given such quick dispatch at the ports of discharge. The delays to which sailing ships are liable, according to the practices which prevail at most ports at home and abroad, are very often advantageously utilized in cleaning the inner surface of the plating, and for this reason, more than for any other, it will probably be found in a few years hence that the life of an iron or steel sailing ship which escapes the perils of the seas is very much longer than that of a steamer. So far as opportunity for comparison has been afforded, the evidence altogether points in that direction.

But steamers are exposed to sources of deterioration from which sailing ships must necessarily be exempt. Inaccessibility is one of these, and it applies particularly to the neighborhood of the machinery and to the interior of ballast tanks and cellular bottoms. It is practically impossible to give that attention which is needed to the portion of the hull below the working parts of the machinery, and in most vessels it is difficult to look after the framing below the boilers. The renewal of boilers is always attended with the necessity for repairs to the boiler settings and the adjacent framework of the vessel. But such wear and tear is local in its character, and may be made good at a comparatively small cost. The interiors of ballast tanks and cellular bottoms are of course examined at all periodical inspections, but corrosion of the floors and longitudinal girders cannot be prevented, seeing that the double bottom space is frequently filled with water and always damp. If the cement on the inside of the plating and frames is kept in a good condition that is as much as can be done to preserve that part of a steamer from decay.

The corrosion which goes on in the coal bunkers, due to the presence of sulphur in the coal, and frequently of moisture also, is

a serious sort of mischief; but it may be minimized, and indeed reduced to very small proportions, by frequent cleaning and painting, taking care never to apply the paint to either a damp or rusty surface. Whenever a steamer reaches a home port after a foreign voyage of several months' duration the state of the bunkers should be examined, and, if necessary, the remainder of the coals should be removed in order that the iron-work may be properly dealt with. Having referred to the machinery spaces, bunkers, double and cellular bottoms, and the results of quick dispatch, there appears to be nothing left to distinguish the cases of steamers from those of sailing ships, so far as regards the tendencies to decay and the precautions to be taken in order to make them durable.

Both sailing ships and steamers have at times iron or steel decks, upon which no wood flat is laid, but such an arrangement is much more frequently met with in the latter than in the former. It is to be feared that iron and steel decks will prove a source of trouble in consequence of their rapid corrosion, which nothing tried up to the present time has been able to arrest. It will easily be understood that the frequent breaking of salt-water spray upon the surface of an iron or steel plate should cause it to corrode, but the wear and tear of deck plating is found to be much more rapid than that of the outer surface of topside plating exposed to similar conditions. The strength of many iron and steel ships is largely dependent upon the efficiency of their iron or steel decks, so that by and by the condition of those decks will become a serious question to shipowners and ship surveyors. The first use of iron decks was of too recent a date to enable an estimate to be yet made of their ultimate durability, but the thick incrustations of rust commonly found on the iron decks of steamers which were built only four or five years ago point to a speedy reduction in their substance.

One valuable fact in relation to the durability of iron and steel ships has for some years past been well understood by most shipowners, viz., the necessity for avoiding all wood or other linings on the inside surface of these ships above the cement level. Even in poops and forecables all coverings to the frames and plating should be avoided. Nowhere does corrosion proceed at a more rapid rate than behind linings where moisture can collect without a sufficient current of air to evaporate it. Exposure, accessibility and frequent cleaning and painting are necessary for the preservation of iron and steel surfaces. Whenever a surface of iron cannot be got at, as in the case of iron deck plating, stringers, tie plates, &c., below a wood deck, moisture must be carefully excluded, and this can be done only by properly attending to the caulking. If the woodwork is carefully fitted in the first instance, and bedded upon thick red-lead paint, also if the bolts be tightly driven and their nuts screwed upon grumets and washers, then, by keeping the deck seams tight, the durability of the deck plating may be insured.

A well-built and carefully kept iron or steel sailing ship should be practically indestructible so far as decay and wear and tear are concerned, and the life of a steamer is of less duration only in so far as regards the parts to which special allusion has been made. Whether or not it will commercially pay a shipowner to take such care of his vessels, bearing in mind the risks of ocean navigation to which all ships alike are exposed, is, of course, another matter, but that the use of iron and steel has made it possible to own shipping at less cost for maintenance than formerly there can be no doubt. This fact has been a considerable factor in reducing the cost of ocean freightage, and therefore in bringing produce at a cheaper rate to the consumer. It has, moreover, tended to augment our national wealth, inasmuch as a ship costs less per ton to build and less per ton to keep in good order than was formerly the case. That the average life of a ship should be less than it was under pre-existing conditions shows either that less care is now exercised in their navigation or that the inevitable risks of ocean navigation have been increased. Probably the greater number of ships traversing the seas and the hurry and drive which characterize their movements have a great deal to do in increasing the proportion of shipping casualties. But the ships themselves are stronger and the conditions relating to their maintenance are more favorable than was the case in the days of our wooden walls.

A few of the striking employees of Henry Duxton & Sons answered the invitation issued by the firm last week and returned to work on Monday morning. At the office it was stated that 15 or 20 of the old hands had made application for work, and had been taken back. To those who failed to make application at the office the following notice, signed by the firm, was issued and posted in a conspicuous place outside the gate: "All of our hands who failed to report to-day must make personal application for work if they wish to resume, as we cannot employ all of those who quit our service." The Arbitration Board of the strikers visited the Executive Board of District Assembly No. 1 at their headquarters, No. 806 Girard avenue, and communicated the decision of the men to accept the firm's proposition to settle the matter by means of an investigation of the wage lists paid in other similar establishments. The strikers will choose a man from the steel-melting department and another from the rolling mill, who, in company with a representative of the firm, will visit steel mills in different sections of the country at the firm's expense. This will probably consume the remainder of the week, and a resumption of work is looked for next week.

Chinese gongs about 2 feet in diameter, sounded at short intervals, have been for many years the recognized standard fog signal of light-vessels, owing probably to their peculiar characteristic sound. This signal is undoubtedly distinctive and serviceable at very short distances, but, like the sound of a bell, is soon dissipated after leaving the immediate vicinity of the instrument.

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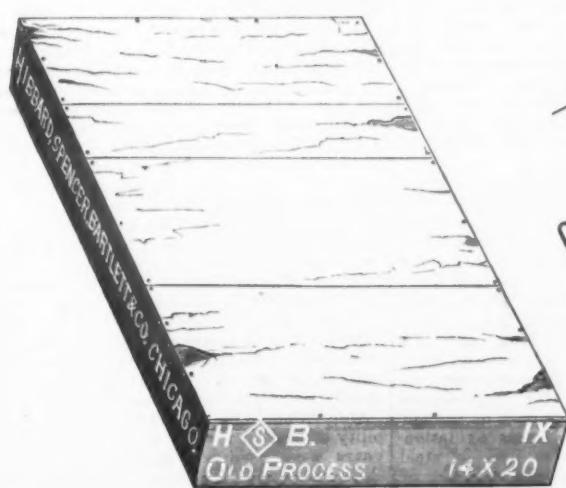
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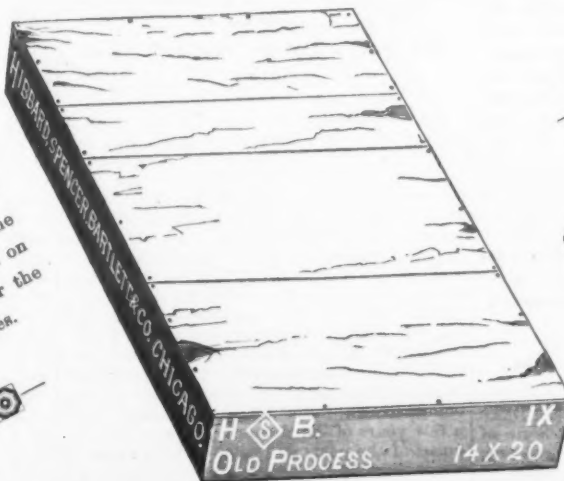


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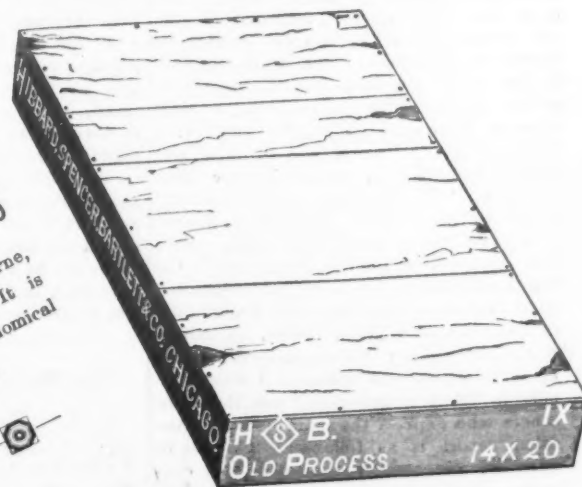
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Chucks.

Clocks, Springs, &c.

Clothes Dryers.

Coal and Hat Hooks.

Cocks, Steam, Gas, &c.

Coffee and Spice Mills.

Coke.

Commission Merchants, Iron, Steel, &c.

Copper.

Corn Shellers.

Corrugated Iron.

Covers, Boiler and Pipe.

Crucibles.

Cutlery, Importers of.

Cutlery, Manufacturers of.

Dampers.

Dawson's Patent.

Deers.

Door Checks and Springs.

Door Hangers, House and Barn.

Door Locks.

Door Springs.

Drawings, Knives.

Drilling Machines.

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Gin Ribs, &c.

Glass Cutters.

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Levels.

Trade Report.

New York.

American Pig.—The scarcity of Foundry Iron, and particularly of No. 1, continues unabated, and, in fact, has been growing worse during the current week. The sellers generally are demanding close up to \$19, which has been paid recently in the majority of cases. There are a good many conflicting rumors concerning the possible action of the leading furnace companies, so far as contracts for next year are concerned, but, as we had occasion to state some time since, it is believed on good authority that they will not be entered into until possibly the beginning of next year. Contradictory reports are current in regard to them, some asserting that a considerably higher price will be fixed upon, while others insist that it will be the policy of the companies to keep the prices low, so far as it is in their power to do so. We quote Standard brands No. 1 Foundry, \$18.75 @ \$19; No. 2, \$17.50 @ \$17.75; and Gray Forge, \$16 @ \$16.50.

Scotch Pig.—There has been a little more doing, but yet the market remains quiet, and interest centers chiefly in the news from the other side, where the market continues strong, with a rising tendency. Higher prices have been paid during the week, and importers generally insist upon revised quotations, which are: Coltness, \$21.75 @ \$22 to arrive; Gartsherrie, \$20.75 @ \$21; Shotts and Langloan, \$20.75 @ \$21; Carnbroe and Glengarnock, \$19.50 @ \$20; Summerlee, \$21; Dalmeilington, \$19.75 @ \$20; Eglinton, \$19 @ \$19.50, and Clyde, \$19.50 @ \$20.

Bessemer Pig.—There have been some sales of Foreign Bessemer Pig during the current week, one lot of 2000 tons being placed under \$19. Sellers generally insist upon the latter figure as the lowest basis for transactions still pending. We are informed that Foreign Iron has been bought chiefly for the purpose of mixture, since the price is still above that of domestic works. There have been some sales also of Domestic Pig.

Spiegeleisen.—The market has gained in strength under inquiries from a number of the different Steel works, and it is rumored that there is a speculative movement abroad. The only transaction reported is a sale of 2500 tons for early delivery. We quote \$25.50 @ \$26 for 20% Spiegeleisen, option English or German.

Bar Iron.—The rise in raw materials of all grades of Bar Iron and the greater volume of business done keep the market steady. We continue to quote Common Iron, 1.65¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢; and Refined, 1.85¢ @ 1.95¢.

Structural Iron and Steel.—The current inquiries, while numerous, are not in the aggregate equal to those of former weeks, but, as the mills are still full of orders for the near future, the market continues steady and firm. We quote, according to quality, for Angles 2.15¢ @ 2.30¢, delivered, and Tees at 2.5¢ @ 2.6¢, for round lots. Steel Angles are quoted 2.40¢ @ 2.50¢, according to quality. Store quotations remain 2.45¢ @ 2.50¢ for Angles, and 2.75¢ @ 2.8¢ for Tees. American Beams and Channels are nominally 3¢ base from dock for all orders.

Merchant Steel.—We quote nominally for the range of ordinary to good grades as follows: American Tool Steels, 7½¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15½¢; common grades, 7¢ @ 9¢; Crucible Machinery, 3.75¢ @ 4.50¢. The Steel Association quotes base prices: Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.3¢; Square-Edge Tire, 2.5¢; Toe Calk, 2.4¢; Sleigh Shoe, 2.2¢ @ 2.5¢; Open-Hearth Machinery, 2.5¢, and Bessemer Machinery, 2.5¢.

Plates.—For immediate delivery the market is firm. For the future mills have less work, but are relying upon the prospect of current orders to keep them busy. We quote for round lots: Common or Tank, 2.25¢ @ 2.35¢; Refined, 2.35¢ @ 2.40¢; Shell, 2.5¢ @ 2.6¢; Flange, 3.40¢ @ 3½¢; Flange, Extra, 4¢ @ 4½¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3½¢; Flange, 3½¢, and Fire-Box, 4½¢ @ 4½¢, on dock.

Steel Wire Rods.—Beyond a small current business nothing has been done. It is difficult, even practically impossible, to place orders for early delivery, while for the future the market is dull at \$36 @ \$36.50.

Steel Rails.—We hear of a sale of one lot of 5000 tons by an Eastern mill and of a number of smaller orders, otherwise the market has been very quiet in the East. In the West, on the other hand, there have been very heavy transactions, aggregating fully between 100,000 and 120,000 tons for 1887 delivery, in some cases up to November. This business has been distributed between the Edgar Thomson, Cleveland, Union, North Chicago and Joliet mills. Nearly the entire quantity has been taken by Western and Northwestern roads, one company alone placing an order for 40,000 tons. It is understood that the bulk of this business was done at \$37 @ \$37.50, Chicago. The Pennsylvania Railroad will during this week

place its usual large order, ranging between 25,000 and 30,000 tons, with three mills on the line of its road. We hear also of a sale of 10,000 tons of Foreign Rails, Cammel's, made to a Southwestern road, delivered at New Orleans, at a price which, it is stated, lies between \$37.50 and \$38. It is evident from the quotations which have been made by foreign sellers in the Southwestern and Pacific Slope markets that the territory is for the present controlled by them. Even the most favorably located American mills for Gulf delivery cannot come within \$1 @ \$1.50 of the prices which have been paid during the past month or two. We quote for early delivery at Eastern mills \$35 and for 1887 delivery \$34 @ \$34.50.

Old Rails.—We note a sale early in the week of about 1600 tons of American T's at \$21, f.o.b. at Eastern port. Also a sale of 500 tons of Foreign T's and bridges and of 1200 tons of Double Heads from store for the West; 5000 tons of Foreign T's have been sold at \$21.50, delivered at Philadelphia, for October, November and December shipment.

Scrap.—The market is firmer and some small transactions have taken place during the week. The majority of holders ask prices considerably higher than those which consumers are willing to pay. While the supply in yard is small, there is considerable Scrap Iron in store, and the demand continues moderate. We quote nominally \$19.50 @ \$20 from yard.

Rail Fastenings.—We quote 2.15¢ @ 2.25¢ for Spikes, delivered at New York, 1.75¢ @ 1.90¢ for Angle Fish Bars, 2.50¢ @ 2.75¢ for Bolts and Square Nuts, and 3¢ for Bolts and Hexagon Nuts.

Philadelphia.

Office of The Iron Age, 230 South Fourth St., Philadelphia, October 12, 1886.

The market has been somewhat less active during the past week, but the feeling is growing stronger, and an early movement toward slightly higher prices is confidently expected. The position of sellers is steadily improving, but there is a good deal of hesitancy in regard to the future. The "boom" which took place some years ago is too recent to be forgotten, and the intention is to avoid, if possible, a repetition of the events of that time. Consumption is believed to be larger than it has ever been, but the capacity for production has grown in still greater proportion, so that there is no probability of inconvenient scarcity. After so many years of depression it is only natural that producers should desire the highest figures the market will afford, but a steady, uniform business is thought preferable to a few months of abnormally high prices, followed by years of depression. Consequently there is no disposition to crowd prices too rapidly, but rather to meet the demand with such slight advances as may seem to be warranted from time to time. A sharp watch is kept on foreign markets, and it may be taken for granted that no material advance will be made here unless foreign markets lead. There are some indications of a movement of that kind, but it will not do to repeat the mistake of 1880-81 by loading up at rapidly advancing prices, and then find that after all our own mills and furnaces could have supplied better and cheaper Iron, and that, too, quite as soon as the stuff was required. That kind of trading does not prevail at present. There are very few buyers but would be glad to duplicate every purchase they made last month, but they are not uneasy because they cannot do it. The disposition is to wait until they are more nearly in need, and then pay the advance if it is unavoidable. People do not scare the way they used to, and unless some great change of feeling takes place they will not run the market up on themselves. Under these conditions there is reason to expect steady, perhaps slightly higher, prices, and a very large volume of business.

Pig Iron.—The market has become firmer, although the demand is not quite as active as it was a week or two ago. The position of holders becomes stronger from week to week, and, after dropping all the inside quotations, the higher figures are now being made a little higher still. Brands that were \$19 during the summer months gradually moved up to \$19.50; now \$20 is named, and so on all the way through. There is no concerted movement, but each brand is held with increasing firmness, and at higher prices. Some buyers have been trying to place orders for next year's delivery, but very few have been able to do so at the old prices. In the majority of cases sellers decline to quote. They are either not ready to commit themselves squarely to an advance or are undecided as to the extent of the advance, but in any case they will not duplicate contracts made for the last quarter of the current year. Some of the smaller companies are selling a little Iron at about \$19 @ \$19.50 for No. 1 Foundry, delivered at tide; others quote \$20, and it would probably be a difficult matter to buy largely at the inside figure. The market is evidently moving toward \$20 for No. 1, \$18 for No. 2, and \$17 for Gray Forge, although as yet very little business has been done at these figures. One of the strongest features in the market is the absolute scarcity of good brands for immediate delivery, and, although no one need suffer inconvenience for want of Iron of one kind or another, it is significant that

several leading companies have less stock on hand than they have had for years. Sales during the week have been at prices ranging from \$16.25 to \$16.50 at tide for Gray Forge, \$17.50 for No. 2 Foundry, and \$19 to \$19.50 for No. 1, asking rates now being about 50¢ higher. Southern Iron is entirely out of the market; nothing for sale at prices likely to be acceptable to buyers.

Foreign Iron.—Bessemer Iron is very much neglected, there being no demand, although offered at unusually low figures, say \$18.50 @ \$19. Spiegel is in demand, with a probability that large lots would be taken at about \$25.25 @ \$25.50 for 20%. Sellers quote \$26 firm, so that no sales have been made.

Blooms.—Foreign markets are very sensitive just now, and it is difficult to get any one to name firm quotations. Cable advices report mills full of work for the balance of the year, and owners not disposed to do anything at present prices. Nominal rates are about as follows: Rail Blooms, \$26.50 @ \$27, c.i.f., duty paid; Nail Slabs, \$28 @ \$28.50; Sheet-Iron Billets, \$29 @ \$30; higher qualities for Boiler Plate, &c., \$36 @ \$38; Charcoal Blooms, \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35, and Ore Blooms, \$34 @ \$35.

Muck Bars.—There is a fair demand, but prices remain about as last quoted, say \$30.50 @ \$31 at mill.

Bar Iron.—There is not much change since last week. Some say the demand is less active, but those having orders to place find the mills very full of work, and prices firmer than they have been for years. The demand for specialties has been very large, and almost every mill in the neighborhood has from six to eight weeks' work on hand. This with a considerable daily demand has placed manufacturers in a strong position, so that prices are easily maintained, and, in fact, look very much as though they might go still higher. City mill prices are from 1.9¢ to 1.95¢, store prices 2¢ for best Refined Bars; medium quality, 1.75¢ @ 1.8¢. Skelp 1.95¢ @ 2¢ for Grooved and 2.25¢ for Sheared.

Plate and Tank Iron.—No change can be reported in this department. There is a very urgent demand for quick deliveries, but as the mills have about all their capacity engaged it is difficult to place new orders, although full prices would be paid. The outlook is very satisfactory, plenty of work secured for the balance of the year, with inquiries for large lots for later dates. Prices are about as follows: Ordinary Plate, 2.20¢ @ 2.25¢, delivered; Tank, 2.25¢ @ 2.30¢; Shell, 2.5¢; Flange, 3.5¢ Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4½¢ @ 5¢.

Structural Iron.—As in other departments, business is very active. There is all the business that can be handled—more than can be disposed of promptly. The amount of work in hand among all the large consumers is ample guarantee for activity in Structural Iron for months to come. Prices are firm, and may be quoted about as follows: 2.20¢ @ 2.25¢, delivered, for Angles; 2.25¢ @ 2.35¢ for Bridge Plate; 2.6¢ @ 2.7¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is no special change to note; the demand is satisfactory and prices are steady, but have not advanced in proportion with other specialties. There has been a gradual stiffening, however, and quoted rates are more generally adhered to than they have been for some time. The usual quotations are about as follows:

Best Refined, Nos. 26, 27 and 28.....	3½¢
Best Refined, Nos. 18 to 25.....	3¼¢
Common, ¼¢ less than the above.....	4½¢ @ 5¢
Best Sheet, Nos. 22 to 25.....	4½¢ @ 4½¢
Best Sheet, Nos. 16 to 21.....	3¾¢ @ 4¢
Blue Annealed.....	2.6 @ 2.70¢
Best Sheet, Galvanized, discount.....	60¢
Common, discount.....	65¢

Steel Rails.—The feeling is gradually improved, and with inquiries for large lots, and a certainty that consumption will be fully equal to the maximum of production, manufacturers are disposed to be very firm in quoting \$34.50 @ \$35 at mill. A good deal of discrimination is used in regard to deliveries, as there is a large amount of business on hand, and makers are desirous of accommodating their regular trade as far as possible, besides keeping some room for new orders in case prices make a sudden advance. On the whole it is considered that the position is improving, and present quotations as low as will be made perhaps for a long time to come.

Old Rails.—The market has a very firm tone, and with very light offerings prices are higher. Sales have been made at \$21.50 @ \$21.75 for shipments to Philadelphia, with the last-named figure now bid, and \$22 asked.

Scrap Iron.—There is no special change; the demand is fair and prices well maintained, as follows: No. 1 Wrought Scrap, \$19 @ \$19.50; Selected do., \$20 @ \$21; No. 2 do., \$13 @ \$14; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50. Fish Plates wanted at about \$25.

Wrought-Iron Pipe.—Nothing of importance to note. The market has a strong undertone and mills have all they can possibly attend to. There is a great demand for large sizes—in fact, greater than the supply—causing more or less of a scarcity. Prices remain firm and unchanged. Discounts are as follows: Lap-Welded Black, 52½¢;

Butt-Welded Black, 40¢; Butt-Welded Galvanized, 30¢; Lap-Welded Galvanized, 35¢; Boiler Tubes, 47½¢.

Nails.—Notwithstanding the cutting of price both in New York and Baltimore, the Philadelphia market shows no disposition to follow. Of course there are some brands of Nails that for carload lots can be bought as low as \$1.95 and perhaps less, but for a No. 1 goods \$2.20 from store is the price, and holders of such Nails are determined not to sell for less. Stocks are light, two of the representative mills being closed, one for repairs, the other on account of labor trouble, but both are expected to resume in the course of a few weeks.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., October 12, 1886.

There is no important change to note in the general business situation; there is continued activity, and it is of a regular, legitimate character. There is no evidence of a speculative mania, so common in years gone by. Notwithstanding the season for work of that character is being pretty well advanced, natural-gas development is still being pushed forward with a good deal of energy, and there is no abatement in the demand for Pipe in consequence. All the towns in this section of the country will soon be supplied with gas, and instead of being the greatest this will be one of the lightest Coal consuming sections in the country.

Pig Iron.—There has been less business the past week, but for this good reasons can be assigned. A great many consumers have been buying freely for some time past, not only for immediate but for future delivery; most of them have contracts covering their wants from one up to three months to come; the fact that there has been an advance of from 50¢ to 75¢ per ton has not been without its influence in checking sales. Furnaces here and at nearly all points tributary to this market are sold ahead; offerings are light in consequence, and this fully offsets the fact that consumers all bought ahead. Indeed, notwithstanding the volume of business has fallen off somewhat, the market is even stronger than it was a week ago, and furnaces generally expect prices to go still higher. But very little Southern Iron has been offered here for some time past. We quote prices as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.50, 4 mos.
All-Ore Mill.....	17.00 @ 17.50 4 "
White and Mottled.....	15.00 @ 15.50, 4 mos.
No. 1 Foundry.....	18.00 @ 18.50, 4 "
No. 2 Foundry.....	17.00 @ 17.50, 4 "
No. 3 Foundry.....	16.25 @ 16.50, 4 "
Charcoal Foundry.....	20.00 @ 20.40, 4 "
Cold-Blast Charcoal.....	24.00 @ 27.00, 4 "
Bessemer Iron.....	19.50 @ 20.00, 4 "

It is claimed that sales of Bessemer Iron have been made at \$18.75 @ \$19, cash, but buyers claim that it is still to be had at \$18.50, cash, but this, to say the least, is doubtful. Good brands of Gray Forge are stiff at \$16.50, four months; sales of All-Ore Mill at \$16.65, cash.

Muck Bar.—Is firmer, in sympathy with the advance in Pig Iron, and we now quote at \$28 @ \$28.50, cash. There have been but few sales above \$28 @ \$28.25, cash, very few above \$28, but some mills are asking \$29.

Manufactured Iron.—The mills are reported pretty fully employed, and the market for good Iron may be quoted steady on a basis of 1.70¢ @ 1.75¢ for Bars, 60 days, 2¢ off for cash. There has been a gradual stiffening up for some weeks past, owing to increased demand as well as the enhanced cost of Pig Iron. Skelp Iron, for which there has been a heavy and urgent demand for some time past, has advanced more probably than any other kind, and large orders for immediate or near-by delivery have had to be refused, as the mills making it are all sold ahead. Railroads continue to be liberal buyers of Merchant Iron, as the car shops and locomotive works are all busy, and as a rule they want a good quality of Iron; some of them will not have Old Rail Iron at any price. Mills using Old Rails will also have to put up prices, as Rails have advanced much more than Pig Iron of late.

Nails.—There has been no important change in the situation since our last report; there is a fair business, and, so far as we can learn, the prices adopted by the association at their last meeting are being adhered to. We continue to quote in carlots and upward at \$2, 60 days, 2¢ off for Iron, and \$2.10 for Steel. Of the factories here Ches, Cook & Co., Shoemaker & Co. and Jones & Laughlins are in operation, while those of Zug & Co. and Moorhead, Bro. & Co. are standing idle. The regular monthly meeting of the Western Nail Association takes place to-morrow at Cincinnati, but it is not expected that anything beyond routine business will be transacted.

Wrought-Iron Pipe.—The Pipe mills are all being pushed to their utmost capacity, and this will be the case for some time to come. Prices firm, but unchanged. Discount on Black Butt-Welded Pipe, in carlots and upward, 42½¢; Galvanized do., 32½¢; Black Lap-Welded, 55¢; Galvanized do., 37½¢. Less than a carload discount 2½¢ below rates above quoted. Boiler Tubes, 47½¢; Casing, all sizes, 47½¢; 2-inch Tubing, 15¢ per foot, net; 8-inch Drive-Pipe, \$1.40.

Old Rails.—The market for Old Rail Rails continues in an unsettled condition,

owing to the continued upward tendency in prices. There have been but few sales made of late, in the absence of which we quote at \$24.50 @ \$25. There have been, so far as we can learn, no sales made as yet above \$24.50, but they are not to be had now under \$25. Old Steel Rails also scarce and firm; quoted nominally at \$22 @ \$22.50 for short and \$23.50 @ \$24 for long lengths.

Steel.—There is a continued good demand for all kinds of Merchant Steel, and prices are firmer. Bessemer Blooms and Billets quoted at \$31.50 @ \$32, and the same quotations are being made for Nail Slabs; Rail Ends and Bloom Ends are in demand, with but very few offerings. Best brands of Refined Cast Tool Steel, 8¢ @ 9¢; do. Crucible Machinery, 3½¢ @ 4¢; Open-Hearth do., 2½¢ @ 2½¢.

Steel Rails.—Mills here are not in condition to take orders for immediate or near by delivery, and there are not very many orders offering for next year's delivery.

Railroad Track Supplies.—There is a fair demand, and prices are firmer, but without change. Spikes, 2.40¢, 30 days, delivered; Splice Bars, 1.70¢ @ 1.75¢; Track Bolts, 2.75¢ with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

Old Material.—There is an increasing demand, and all kinds of Scrap are firmer, in scant supply and tendency upward. No. 1 Wrought Scrap has sold at \$18.50 @ \$19, net ton; Wrought Turnings quotable at \$14 @ \$15; Car Axles, \$24 @ \$25; Cast Borings, \$12 @ \$13, gross; Old Car Wheels, \$17 @ \$17.50; Open-Hearth Steel, mixed lots, \$21 @ \$22, gross ton, and in demand.

Coke.—Blast-furnace Coke remains unchanged at \$1.50 per ton on cars at ovens.

Window Glass.—There is a fair business, but no recent change in prices. Discount still quoted at 75¢.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., Chicago, October 11, 1886.

The favorable conditions of trade have continued through another week. Orders have been piling up to an extent almost unprecedented. Immediate wants are so pressing that buyers to induce prompt delivery at times voluntarily offer an advance on the market value for some classes of Iron. There seems to be no impediment in the progress of trade. The danger now apparently lies in a too rapid increase in the price for Pig Iron and finished material. The country is becoming excited over the prospect. Each manufacturer is forcing his capacity to enlarge his stock, with, at the moment, good prospects that it will have a ready sale, but as all others are doing the same thing it looks as if the market might be overstocked during the winter. Manufacturers who are now having a reasonable profit on their respective lines would do wisely in taking only enough orders to keep them well employed at current rates, instead of demanding higher prices as a premium for delivering goods on late orders and putting off deliveries on those that were placed weeks before at a lower figure. This sort of dealing has a tendency to "boom" prices illegitimately, which would certainly be disastrous to next year's trade if carried to excess. Higher prices now prevail in all classes of Iron products. On Pig the advance ranges from \$1 to \$3 per ton in this market, according to grade, and about the same proportion of advance is being obtained on all goods proceeding therefrom.

Hardware.—Jobbers have had another very busy week. Orders and shipments thus far this month are greater than for the same period in September. While the demand for Shelf Hardware and seasonal goods is excellent, that for Heavy Hardware, Wagon and Carriage Wood stock is more than can be taken care of. The general clamor for prompt shipment is holding prices firm and giving manufacturers an excellent opportunity to advance prices. Beyond the growth of trade and the increased firmness at which all goods are selling there are no new features to mention. Quotations on Wagon Springs and Axles have been withdrawn. All stocks pertaining to this line of manufacture are scarce.

Barb Wire.—The demand for small lots continues very good, and jobbers quote from store 3¼¢ for Painted and 4¢ for Galvanized. These prices are shaded in larger lots and less than carloads. Manufacturers quote carload lots 3¢ for Painted and 3½¢ for Galvanized. The demand for such quantities is gradually falling off, but nevertheless fair for the season. The low prices which have prevailed for months have no doubt induced large buyers to lay in supplies that will cover their fall demand, and perhaps portions of that for next spring. While makers' stocks are light now there will be an opportunity for accumulation, and prices are consequently expected to continue weak for some time to come.

Nails.—Jobbers continue to quote Iron Nails from store at \$2.20, and Steel Nails at \$2.30, with the usual rebate of 5¢ per keg in carloads, 1¢ off 30 days. We hear of no shading of these figures on Steel Nails, on account of light stocks and the extra demand. Iron Nails are less firm, but no open concessions are noted. In carloads makers' price at mill is \$2.10, net, 60 days, 2¢ off to days, for Steel Nails, with the understanding that Iron Nails shall be sold at 10¢ below the price of Steel. The Jones & Laughlins mill, Pittsburgh, began cutting Nails to-day. Their warehouse here has

been almost depleted of stock of any kind Wire Nails are unchanged at \$3.50 per keg as jobbers' price.

American Pig Iron.—There continues to be a heavy demand. It was presumed several weeks ago that the bulk of contracts for this year's supply had been placed. In looking over sales agents' books for the past week there has been at least 25% increase in the tonnage over the last week in September and the first week in October. There appears to be no end to the amount of work foundrymen are having, and whenever they obtain a new order for castings they immediately cover it on Pig Iron, which they seldom can obtain without meeting an advance of 25¢ @ 50¢ per ton. The product of Lake Superior Charcoal furnaces relatively has never been greater, and yet for immediate delivery most of the makers are out of the market. Those who can sell are reaping the benefit of 50¢ per ton advance on carload lots. Lake Superior Charcoal Iron is now quoted \$20 @ \$20.50 on choice brands in lots of 100 tons or more, not exceeding 90 days' delivery. Coke Irons for prompt shipment are no more plentiful than the Charcoal brands, and are commanding about the same figures for small and round lots. Standard brands are quoted at \$19.50 @ \$20, and sales have been refused at less than these figures during the past week. All Ohio Blackband Irons are now pretty well equalized in prices. Quotations range from \$20 to \$21, four months, in carload lots, and choice brands cannot be had in large quantities, furnacemen being unwilling to make additional contracts for extended delivery. Many of the buyers would be willing to contract for a six months' supply on any of the above grades of Iron, but we hear of only one sale that was made during the week extending over three months. Hanging Rock Soft Coke No. 1 is quoted at \$18.75 and No. 2 at \$17.75. The demand for Southern Iron has lately improved, but the advanced price at which Iron is held has almost entirely excluded transactions. Prices have again advanced as follows: No. 1 Foundry, \$19 @ \$19.50; No. 2, \$18 @ \$18.50; No. 2½, \$17.75; No. 3 Foundry and No. 1 Mill, \$17.25. Furnacemen report an extraordinary demand and the above prices very unsteady. There appears to be an irrepressible tendency to further advance prices, which is exciting the opinion of buyers on the advisability of placing orders for future delivery. It is authoritatively stated that one furnace company have 25,000 tons booked ahead, and have now before them a favorable offer on 10,000 tons more. Another company in the Birmingham district report 17,000 tons sold and two others of 12,000 to 15,000 tons each. It is believed in this market that this about approximates the condition of Southern furnaces, only differing in quantity contracted for by each one, and clearly shows why the Iron is reported scarce here.

Merchant Steel.—On the finer grades trade is reported very good for the week. Tool Steels, Drill Rods, Round and Flat Machinery of the better grade are the greater in demand, much of it coming from the mining districts. There has also been a very good demand for Plate Steels from points along Lake Superior where Ore docks are being erected. No large orders were placed for common grades, though prices on cheap Steels are reported to be gradually improving. Jobbers make the following quotations: Low-grade Tool Steels, 7¢; standard brands, 7½¢ @ 8¼¢; Crucible Machinery, Round and Flat, 4¼¢ @ 5½¢; Spring Steels, railroad sizes, 4¢; Open-Hearth and Bessemer Steels, 2½¢ @ 3¢; Plow Steels, 4½¢ @ 5¢.

Steel Rails.—There are no developments of importance in this market. Prices are nominally as last quoted. The North Chicago Rolling Mill Company met with a serious accident in the collapse of their repair shops at South Chicago yesterday, which resulted in the killing of three men and the maiming of seven or eight others who were in the shop at the time. The entire works with the exception of the blast furnace were closed down temporarily.

Structural Iron.—The demand for Beams and Channels is something unusual for this season of the year. Makers are overrun with orders for stuff that they cannot supply, and builders are furious over the delay on material under contract. We hear of Punched Beams having been sold at \$3.60, which is 40¢ above the prevailing combination prices. Inquiries for small lots are so frequent that the Pottsville Iron and Steel Company, represented by Charles B. Froment, 115 Dearborn street, issue a weekly card to the trade specifying what sizes and shapes will be rolled during the ensuing week. Stocks in yards are all light, with no chance of replenishing. The following prices are noted as firm: Beams and Channels, combination price, 3.10¢; store price, 3.50¢; Angle Iron, 2.40¢; T Iron, 3¢; Plitch Plates, 2½¢ @ 2¾¢.

Bar Iron.—The extraordinary demand has worked marked changes in the condition of the market. Best Refined New Puddled Iron is now quoted from store in small lots at 2¢, and in lots ranging from 5 to 10 tons at 1.90¢. The 1.90¢ rate would perhaps be applicable to regular customers in less than 5-ton lots, but sales are not solicited from new trade at less than these prices. What has been known for several years past as Common or Old Rail Iron, from present appearances, will soon be extinguished. Makers who have been rolling

this class of Iron declare that they cannot afford to pay present prices for Old Rails to work into Bars. Makers of the second grade of Iron are quoting 1.75¢ @ 1.80¢ rates at mill. Jobbers of the same class of Iron quote 1.90 @ 2¢ in small lots, city trade, and 1.85¢ rates to country merchant trade. Jobbers complain that they cannot get mills to accept orders without paying the highest price for immediate delivery. The market in all respects is active and firm, with abundant indications that still higher prices will be forced upon the trade if the present rate of demand continues.

Galvanized Iron.—With the exception that mills report that they are full of work and not desirous of taking further orders the market is about the same as last quoted. On ordinary grades jobbers are still quoting 60 and 5¢ off in Juniata, and 60, 10 and 5¢ off on Charcoal. On the best grades of Iron these prices, however, would be about what makers would ask on round lots.

Black Sheets.—We renew quotations on Best Refined grades at 3.10¢ for No. 24, 3.20¢ for Nos. 25 and 26 and 3.30¢ for No. 27. The demand is good for small lots, and mills are refusing orders. From store jobbers quote ordinary grades at 2.90¢ for No. 24, 3¢ for Nos. 25 and 26 and 3.10¢ for No. 27. Manufacturers say that their price at mill is on a basis of 2.90¢ for No. 27, but cannot take orders for immediate delivery, and expect to advance this price before the first of next month.

Old Rails.—During the week Rails have sold in this market at \$24. Several buyers who have been in the market have given up the idea of getting Rails at a price suitable for their purpose, and are turning their attention toward puddling. Stocks are scarce, but what is left are held at higher figures than consumers are willing to pay.

Old Wheels.—There has been a fairly good demand for Old Wheels; one lot reported sold at \$17 and on another \$17.50 offered. Stocks on sale all light, with the demand greater than the supply obtainable at buyers' figures.

Scrap Iron.—The demand has been unusually good during the last 10 days. Mills which are looking toward changing their process of production have been looking round for cheap lots of Scrap, which has forced the price on No. 1 Forge up to \$21 asked by sellers. Several round lots were sold a week ago at \$19, but cannot be duplicated. No. 1 Mill is quoted at \$15, and No. 2 at \$10; Cast Scrap, \$14, net; Car Axles, \$22.50; Horseshoes, \$17; Stove Plate, \$9; Wrought-Iron Turnings, \$11 @ \$12; Cast Borings, Clean, \$8 @ \$8.50.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, October 11, 1886.

A general review of the condition of business throughout the South, and especially in this district, continues to show a steady upward tendency both in volume and prices of manufactured articles. The railroads are now pushed to their fullest capacity in transporting the freight that is being offered them, and still show no disposition to make any advances in prices at all embarrassing to the manufacturer. Of the number of new industries that are being inaugurated through the Iron districts, a large proportion will no doubt come to a successful issue. Among them may be enumerated the establishment of quite a large concern for the manufacture of Cast Pipe at South Pittsburgh. The men at the head of this undertaking have ample means, large experience in the business, and under the very favorable arrangement that they have made with the furnaces to get the raw material, and with the railroads in the transportation of the finished material to the different markets of the United States, they can hardly fail to make their enterprise a successful one from a financial point of view. Notwithstanding the predictions that real estate had reached its climax, it still continues to advance, and many parcels are changing hands. The general business in merchandising is very active, and the tendency with merchants now is to make quick sales—small profits and quick returns—which upon the whole are much more satisfactory than the old-fashioned Southern style of big profits and long time. The extremely favorable weather that has prevailed through the South for the past two months has enabled the planter to gather the cotton crop in its best condition; the yield will be large in quantity and of a better quality than was anticipated earlier in the season.

Pig Iron.—The market reports from the different trade centers of the North, as published by their respective papers, are a very good index of the general feeling of the producers in the South, with the exception that there are not a few who are inclined to the opinion that a smart boom is near at hand, which could be readily precipitated by a few designing manipulators. There is no question that a degree of sensitiveness on the question of prices is being felt. Many of the furnaces are holding off in the matter of making figures for large round lots, and are confining themselves to small sales at top figures that are given in the market reports. The increase in the consumption of Pig Iron in the South has been very marked this year, and if one-half the projected enterprises become reality it will be doubled during the coming year. Quite a number of sales have been made by the furnaces of

small lots of Foundry, 100 to 300 tons, at \$15 @ \$15.50 for No. 1, and \$1 @ \$2 less for Nos. 2 and 3. Even at these prices the offer of large lots to be delivered through the year and the first three months of 1887 would not be entertained.

Coke.—Is still a scarce commodity with many of the furnaces, and occasionally stoppages are being made for want of it. A strenuous effort seems to have been made, and is still being made, in the construction of more ovens to largely increase the output, but it still falls short of the requirements, and no better opportunity exists to-day in the United States for men with money and experience than to undertake at some suitable place the manufacture of Coke on a large scale.

Miscellaneous.—Prices in all lines of Manufactured Iron have advanced from 5 to 10¢, and 1.75¢ @ 1.85¢ is the ruling rate for Bars, and 2.35¢ @ 2.45¢ for Spikes. Nails have also advanced about in the same proportion. The completion of the works for the manufacture of Butt-Welded Pipe is near at hand, and the event will establish a market quotation for this article. The demand for Furniture from the different factories continues unprecedented, with no prospect of its being lessened in the future.

Birmingham.

BIRMINGHAM, ALA., October 11, 1886.

Pig Iron.—Is in better demand than ever. Only small orders, and these for very early delivery, can be placed here now, nearly all of the furnaces having the bulk of their product sold for two or three months ahead. Transactions are mainly in Mill Irons for the very imperative reason that Foundry Irons are hardly to be had at all, and the stiffening of prices that the latter have shown for some two months is now equally noticeable in the former. One concern whose product has a good reputation, and who are in a position to hold for satisfactory prices, report sales of Mill Irons at \$13 for No. 1, and \$12 @ \$12.50 for No. 2, at the furnace. With these as the top figures prices of the last few days vary as much as 50¢, the upward movement having imparted a remarkable uncertainty to the trade. An order received this morning for No. 1 Foundry nets \$15.20 at the furnace. Production will be considerably increased for the rest of the year. The Williamson Furnace made its first cast on the 6th, and Woodward No. 2 will probably blow in some time next month, while both of the Sloss stacks, which have been cold for some time, will be in blast again by the end of the week. The Williamson Furnace, which is home-built so far as patent rights permitted, is already making Foundry Iron. Its first shipment will be made to-morrow to Cincinnati, being Mill Irons.

Miscellaneous.—Estimates for cast and shop work begin to reflect the increase in the cost of Pig Iron. There is no abatement of the firm demand in this line. Certain shapes of Bar Iron are hard to get. Bolts are up considerably.

Cleveland.

CLEVELAND, October 11, 1886.

Pig Iron.—Business in this market is steadily improving and getting into better shape. The increasing consumptive demand is having its natural effect in strengthening prices, so that not only standard Irons are selling for better figures, but the readiness with which these advanced prices are accepted by buyers is believed to give evidence of higher selling prices all along the line. The advances of 50¢ per ton and \$1 per ton for Lake Superior Charcoal Irons, which have been talked of and obtained in some instances within the past few weeks, are put into our quotations this week, as will be seen by the figures given below. But even this price is not in proportion to the increased cost of production growing out of the higher prices for Ores, and therefore is but one step in the direction of the figures which it is believed must be reached with a few weeks. This expectation is also justified by the increasing demand. The latter is such in the case of a few standard Irons that holders of them are not only not pushing sales, but inclined to offer them at such high figures as to temporarily check the demand. Following are the latest quotations for this market:

Charcoal Pig Iron.	
No. 1 and 2 L. Superior Charcoal	\$21.00 @ \$22.00
No. 3 and 4 Lake Superior	21.50 @ 22.50
No. 2 Foundry, all Lake Ores	17.50 @ 18.50
No. 1 Foundry, Lake Ores with Cinder Mixture	18.00 @ 19.00
No. 2 Foundry, Lake Ores with Cinder Mixture	17.00 @ 18.00
No. 1 Silvery, Native Ohio Ores	17.50 @ 18.50
No. 2 Silvery, Native Ohio Ores	16.00 @ 17.00
No. 1 Gray Forge, Red Short	16.70 @ 17.20
No. 1 Gray Forge, Neutral	16.20 @ 16.70

Iron Ore.—The Iron-Ore market is firm at some advance in prices, though transactions are not brisk for two causes. These are found in the fact that mining companies have light stock of unsold Ores to offer, and for the reason that late advance in prices does not meet the views of buyers. The latter, while admitting that some advance should be asked in consequence of the higher lake freights, are slow and cautious about buying, for the reason that they do not yet see a clear way out on their side. Lake

freights have reached a higher point than for many years, and in the case of shipments from at least one upper lake port are a little more than double what were paid on contracts at the opening of the season. The rates now paid are \$1.75 from Escanaba, \$2 from Marquette and \$2.60 from Ashland. Total shipments of Ores from the upper lakes for the season up to and including September 29 are 2,677,386 tons, which is reported as an increase over the same time last year of 765,169 tons. Receipts at Cleveland last week were 26,315 tons, while there were sent forward to the furnaces 21,674 tons. The movement to the new furnaces for a few days, and possibly for this week, is disturbed by a strike on one of the railways which carries a large share of the Ores from this market. The following are present selling prices in Cleveland:

No. 1 Specular and Magnetic Bessemer Ores	\$6.25 @ \$6.50
No. 1 Specular and Magnetic Non-Bessemer Ores	5.50 @ 5.75
Bessemer Hematites	5.50 @ 5.75
Non-Bessemer Hematites	4.25 @ 4.50

Old Rails.—Transactions in Old Rails have not changed much within the past week. A number of sales are reported at \$22.50 @ \$23 per ton, and no change is reported from the general quotation of \$17 for Old Wheels.

Cincinnati.

CINCINNATI, October 11, 1886.

Pig Iron.—The excitement and feverishness which attended the large movement of Pig Iron noted a week ago have also accompanied the dealings during the week under review. There has been no decrease in the volume of business, but, on the contrary, the aggregate sales have exceeded those of any other week since the opening of the year. The strong and buoyant tone if possible has gained in intensity, and at the close a further advance of 50¢ has been established, one sale of 5000 tons of No. 2 Foundry and No. 1 Mill Southern Coke Iron being reported, based upon \$17 and \$16 respectively, cash, here. A half-dozen sales of 1000 tons each of Charcoal and an equal number of Coke Iron have been made, while orders for 200 to 600 tons have been numerous. The business transacted has been largely made up of orders placed for future delivery, many tons contracted for not to be distributed until the early months of 1887. But while it has been the practice of the Southern furnaces as a rule to contract for their output thus far in the future, it has been the policy of the Northern stocks to keep nearer shore, yet the Southern makers have been to some extent guided by a conservative spirit which looks with disfavor upon a sudden and sharp advance which will of necessity prove pernicious to the trade. It has been due to the scarcity of available Iron that a larger share of the business during the week has not been for cash or close delivery. It is claimed that the leading Southern Coke foundries have accepted orders from 12,000 to 25,000 tons in excess of make, and also that the most prominent Charcoal furnaces are sold from 9000 to 17,000 tons ahead, while a number of others have orders which will absorb their entire output for two to three months to come. Several large consumers of Pig Iron during the week have attempted to stem the tide of the market, holding off from purchasing, arguing against the advance, but with a flood of orders the rise has continued. Furnaces in the Mahoning and Shenango valleys are undetermined as to the future, the extraordinary advance in the freight of Lake Ore unsettling everything. We quote for cash, f.o.b. cars at Cincinnati, as follows:

Charcoal Foundry.	
Hanging Rock, No. 1	\$20.50 @ \$21.50
Hanging Rock, No. 2	19.00 @ 20.50
Southern No. 1	19.00 @ 20.00
Southern No. 2	17.50 @ 18.50
Coal and Coke Foundry.	
Ohio Soft Stonecoal, No. 1	17.50 @ 18.00
Ohio Soft Stonecoal, No. 2	16.50 @ 17.00
Southern Coke, No. 1	18.00 @ 19.00
Southern Coke, No. 2	17.00 @ 17.50
Southern Coke, No. 3	16.00 @ 16.50
Ohio and West Pennsylvania Coke, No. 1	20.00 @ 21.00
Ohio and West Pennsylvania Coke, No. 2	18.50 @ 19.00
Forge.	
Strong Neutral Coke	15.50 @ 16.00
Mottled	13.50 @ 14.50
Southern Coke, Cold Short	15.00 @ 15.50
Car-Wheel and Malleable Irons.	
Southern Car-Wheel	22.00 @ 24.00
Hanging Rock, Cold Blast	26.00 @ 27.00
Hanging Rock, Warm Blast	21.00 @ 22.00
Lake Superior and Malleable	22.00 @ 23.00

Manufactured Iron.—There has continued to be a strong tone prevailing, and the past week has been productive of orders for both Plate and Bar Iron. Bar Iron, 1.65¢ @ 1.75¢; Charcoal Bar Iron, 2.65¢ @ 2.75¢; Sheet Iron, Boiled, Nos. 10 to 27, 2½¢ @ 3¢; Sheet Iron, Charcoal, Nos. 15 to 25, 2½¢ @ 4¢ per lb.

Old Rails.—Higher prices have been asked for both Rails and Wheels, and for the few lots changing hands higher prices have been obtained.

Scrap.—For Rails we quote \$23 @ \$23.50, and for Wheels \$15.50 @ \$16.

Louisville.

LOUISVILLE, October 11, 1886.

Pig Iron.—The market during the last week has been very buoyant in tone, and advanced prices have been thoroughly established. Round sales have been made for delivery during the next three or four months, and large sales for one year's delivery could be booked if there was not so much difference in the views of the buyers

and sellers. Furnaces are asking fully \$1 per ton advance for delivery 12 months ahead, and 50¢ per ton advance for six months ahead. Transactions have been mostly for delivery during the next three or four months, for which full quoted prices have been obtained. From present appearances a further advance on short deliveries will be made soon, as nearly all furnaces are sold up so far ahead on regular grades that they do not feel safe in booking further orders; in fact, some sales booked during the past week have been made with the provision that if the furnace was not able to make the Iron in the time named deliveries would be made as soon thereafter as the Iron was made. We quote for cash in round lots as follows:

Pig Iron.	
Southern Coke, No. 1 Foundry	\$17.00 @ \$18.00
" No. 2	16.00 @ 17.00
" No. 2½	15.00 @ 16.00
Hanging Rock Coke, No. 1 Foundry	17.00 @ 18.00
Hanging Rock Charcoal, No. 1 Foundry	20.00 @ 21.00
Southern Charcoal, No. 1 Foundry	17.50 @ 19.00
Silver Gray, different grades	15.00 @ 15.50
Southern Coke, No. 1 Mill, Neutral	15.00 @ 15.50
" No. 2	14.00 @ 14.50
" No. 1 " Cold Short	14.00 @ 14.50
" Charcoal, No. 1 Mill	16.00 @ 17.00
White and Mottled, different grades	12.50 @ 13.50
Southern Car-Wheel, standard brands	22.00 @ 24.00
Southern Car-Wheel, other brands	19.00 @ 21.00
Hanging Rock, Cold-Blast	23.00 @ 25.00
" Warm-Blast	19.00 @ 21.00

Old Material.—Prices have advanced in harmony with the general advance in Pig Iron. Old Rails are held at \$21, and parties in the South have shipped through Louisville on a basis that would have made the Rails net them \$22 here. Old Wheels, which were sold at \$14, are now being held here at \$15.50, and some sales have been made at these figures. We quote for cash as below:

Rails, per ton	\$21.50 @ \$22.50
Wheels, per ton	14.50 @ 15.50
No. 1 Wrought, per 100	90 @ 95
No. 1 Country Wrought, per 100	70 @ 80
No. 2 Country Wrought, per 100	50 @ 60
No. 1 Cast, per 100	45 @ 55
Boilers, cut, per 100	60 @ 65
Boilers, uncut, per 100	40 @ 50
Flues, Tanks and Sheets, per 100	35 @ 35
Axles, per 100	90 @ 1.00

W. B. BELKNAP & Co., Louisville, report as follows, under date of October 11: Our report must be much the same as last week. Trade continues up to its full volume, and while there is no excitement in any quarter there is promise of a steady demand for some time to come. A prominent Southern customer advises us that owing to the long-continued heat in his section, Alabama, cotton picking has barely begun; hence it is not surprising that their season for purchasing goods may be somewhat prolonged. A good many new enterprises are on foot in all directions which call for Heavy Hardware and Construction Material of all kinds.

Bar Iron.—Is still selling freely, and prices are maintained at the figures which have been current now for two or three weeks. Manufacturers in this as in other lines seem to be afraid of losing trade if they advance prices; on this account some of them seem to be taking more orders than they can promptly fill.

Steel.—We read and hear much about the scarcity of Steel stock, yet but few of the products of Steel have advanced in price. This seems hardly consistent with the assertion made by sellers.

Nails.—Are coming forward but slowly; local stocks are much reduced, and there seems to be no tendency to advance prices further, and but little inclination on the buyers' part to place orders at the full price to day.

Wire.—Is still extremely demoralized; there seems to be no such thing as getting an advance on either Plain or Barbed, though both are selling in fair quantities.

Several lines of Hardware are very active, and spring contracts are being placed with freedom for Steel Goods, Snaths, Cradles, Hoes, &c. Altogether the situation is a comfortable one, and collections fairly good.

St. Louis.

ROGERS, BROWN & Co., St. Louis, Gay Building, 204 North Third street, W. H. SHIELDS, manager, report as follows, under date of October 11, 1886: There has been a smaller volume of business in this market the past week, growing out of the unwillingness of local buyers to keep up with the rapidly advancing views of leading sellers. Some considerable lots have changed hands, all at full prices. There has not been much contracting ahead, however, buyers seeming to think that the little spurt of activity will perhaps subside and give them a better chance later. Meantime the Southern and Ohio furnaces are booking orders covering their full capacity for long periods ahead. One Southern company has over 24,000 tons on its order-book in advance of make, while one Southern Charcoal furnace (that figures prominently in this market) reports its product sold until next May. Business continues good with nearly all of the foundries and all car works tributary to this market, and the average consumption of Pig Metal is much larger than it has been for a long time. The scarcity of cars in the Connellsville district is causing considerable inconvenience; cars are also very scarce for shipment from this point West. We quote for cash, f.o.b. cars St. Louis:

Charcoal Foundry.	
Missouri	\$18.00 @ \$19.00
Southern	18.00 @ 20.00
Coal and Coke Foundry.	
Southern, No. 1	17.50 @ 18.50
Southern, No. 2	17.00 @ 18.00
Ohio Softeners	18.00 @ 22.00
Mill Iron.	
Missouri	16.50 @ 17.50
Southern, No. 1	16.00 @ 17.00
Southern, No. 2	15.00 @ 16.00
Car-Wheel and Malleable Irons.	
Southern	30.00 @ 35.00
Lake Superior	22.00 @ 25.00
Scrap, &c.	
Old Wheels	16.50 @ 17.00
Old Rails	21.00 @ 22.00
Connellsville Coke (Frick's)	5 @ 6

Trade Report.

General Hardware.

The past week has been an uneventful one as regards matters of trade interest. The demand continues without special variation in its general volume, the experience of different parties varying somewhat, as some report an improvement and others a falling off in the amount of orders. There have been exceedingly few changes in price, the leading lines continuing at former quotations, with a rather firmer feeling in several lines of heavy goods. Collections are frequently referred to as being slow, some houses who are in the habit of availing themselves of discounts for prompt cash, taking the full 30 or 60 days on which the goods are sold.

NAILS.

There is in this market a moderate demand for Nails, without change in quotations or in the general tone of the market. The advanced cost of the raw material has not as yet resulted in giving higher prices or a much improved tone. We continue to quote \$2 to \$2.10 for small lots from store, the usual abatements being made for car-load lots. Steel Nails are held at \$2.10 to \$2.20.

BARB WIRE.

The New York market is still irregular and low, with only a moderate volume of business. The desirability of doing something to secure a better margin of profits is admitted by the manufacturers, but without result thus far. Carload lots of Four-Point Galvanized are quoted at \$3.85 to \$3.90.

MISCELLANEOUS PRICES.

In the October 1 list of Iron Rivets, as sent out by the manufacturers, an error occurred in the list price of $\frac{1}{4}$ -inch, No. 4, which was named as 16 cents, instead of 17 cents, the correct figure.

The manufacturers of Locks have been in session in this city to-day, conferring in regard to the condition of the market for this line. Nothing definite, however, was determined upon, and prices remain as heretofore.

Sise, Gibson & Co., 100 Chambers street, New York, have reduced the price of Coulta's Door Holder, Japaned, to \$5 per dozen, net. The Bronze and Nickel-Plated Holders are quoted at discount 50 per cent. The trade will remember that by this Holder the door is held in any desired position by the pressure of the roller on the floor, the roller being covered with rubber to prevent injury to the floor or the covering.

At a recent meeting in Philadelphia the Lawn Mower manufacturers are reported to have adopted the list and discounts of last season for next season's trade.

The North Haven Mfg. Company, North Haven, Conn., are manufacturers of Fowler's Patent Graded Steel and Iron Spoons, the different patterns of which are represented in their circular, the goods being sold at the following price list, which is subject to a discount in case lots of 10 and 5 per cent, with 2 per cent. additional for cash in 10 days:

	Per gross.
Chain Border, Teas.	\$0.90
Chain Border, Tables.	1.80
Roman, Teas.	1.80
Roman, Tables.	1.80
Improved Chain Border, Teas.	1.00
Improved Chain Border, Tables.	2.00
Oval, Teas.	.85
Oval, Tables.	1.70

The Teas are packed 10 gross in a case, and the Tables 10 gross in a case.

E. K. Tryon, Jr., & Co., Philadelphia, issue a circular, October 5, containing a list of Guns, Rifles, Revolvers and miscellaneous Gun Implements, which they are offering on special terms, and of which net quotations are given. They state that some of the goods thus offered have accumulated in excess of their present wants, many are remnants of styles which they have discarded in order to reduce the line, while others consist of old samples, &c. They are alluded to as perfect and new, unless otherwise stated. They also issue, October 10, a circular relating to Harrington & Richardson's Automatic Double-Action Revolvers and Smith & Wesson Revolvers.

Manufacturers of Axe, Pick and Hammer Handles, &c., refer to trade as satisfactory for this line of goods. Prices by the houses in the combination are strictly maintained, and, while lower figures are named by some manufacturers outside, orders are not always promptly executed, and the general market price is not affected thereby. The demand is also referred to as not seriously interfered with by this cause, and a good season's trade is anticipated.

The line of Meat Cutters on the market this season is substantially the same as it has been, and few new ones are offered. The demand is satisfactory and a good season's trade is anticipated.

The following are the prices of the Arc Scales, made by the Arc Scale Mfg. Company, Davenport, Iowa, the list being subject to a regular discount of 50 per cent.:

	Per doz.
No. 1, the Little Wonder, weighs up to 1 pound.	\$9.00
No. 2, Complete Postage Rate Scale, weighs up to 4 pounds.	15.00
No. 3, the Home Friend, weighs up to 10 pounds.	18.00
No. 4, the Everlasting Scale, weighs up to 30 pounds.	30.00

The scales as above are furnished with brackets. The company are also about putting on the market their Plantation Scale, which is made on the same principle as their other goods. The arc is made of malleable iron, galvanized, with its upper end case-hardened to bear well the friction of the weighing bar. The weight index arm folds up against the arc when the Scale is not in use and when portability is desired. The weight of the Scale is 19 pounds.

The existing arrangements for the regularity of the trade in Cartridges are generally regarded as working quite satisfactorily. A few houses of some prominence are making to a greater or less extent irregular prices, but the goods are generally held without deviation from the figures designated by the manufacturers.

The Burnside Mfg. Company, a corporation composed mainly of Cincinnati stockholders, whose mills and factories are located at Burnside, Ky., are putting on the market a line of Red Cedar Faucets, and are represented in this market by W. H. Jacobus & Co., 90 Chambers street, New York. The special features of these goods are mentioned as being that they are made from the best red cedar lumber, and that the perfection of the machines by which they are made permits having the keys interchangeable, and accordingly the keys of the 6, 7, 8 and 9 inch are the same size and interchangeable for any of these lengths. Attention is also called to the low price at which these goods are offered, as per the following list, which is subject to a discount of 50 per cent.:

6 inch, per gross.	\$10.80
7 inch, per gross.	11.52
8 inch, per gross.	12.24
9 inch, per gross.	13.12
10 inch, per gross.	14.40

The further advantages possessed by this line of goods are alluded to as being that they are tasteless, will not corrode, have no lining of cork, leather or other material to become loose, and that, owing to the simplicity of construction and nature of the material, they are very durable. The Faucets are packed in barrels, which contain of the respective sizes about the following number of Faucets: 6-inch, 30 dozen; 7-inch, 25 dozen; 8-inch, 20 dozen; 9-inch, 16 dozen, and 10-inch, 13 dozen. Burnside, Ky., was chosen as the location for their manufacture on account of the abundant growth of red cedar and other hardwoods in the vicinity, and also on account of facilities for manufacturing and shipping, being situated on the Cincinnati Southern Railway, and at the head of navigation on the Cumberland River. The trade will note with interest the offering in these markets of this line of goods of Southern manufacture.

SEABURY S. GOULD.

The death, which has already been announced, of Seabury S. Gould, president of the Goulds Mfg. Company, Seneca Falls, N. Y., occurred at Watch Hill, R. I., September 4. Mr. Gould was born in Sharon, Conn., August 8, 1812, and was therefore at the time of his death in his 75th year. At an early age he lived on a farm, there acquiring that taste for agricultural pursuits which characterized his later years, but in 1834 he made his home at Seneca Falls, where, after engaging in different business enterprises, in 1852 he became a member of the firm of Downs & Co. in the manufacture of Pumps, who made not only the Iron predecessor of the present Pump, but also Wooden, Suction and Chain Pumps. In 1865 Mr. Downs's connection with the Pump factory was closed and the sons of Mr. Gould began to take active part in the management of the business, and the foundation was laid of the present Goulds Mfg. Company. The old name of Downs & Co. was, however, in one form or another retained until 1869, when the present company was organized, the elder Mr. Gould being president, his eldest son, James H., treasurer, and the youngest son, Seabury S., Jr., secretary. This organization has continued to the present time, the direction and control of the business since 1870 having been left with the sons, its present proportions being referred to as the result of the business foresight, application and energy which they inherited. While Mr. Gould is referred to as an eminently successful business man and a public-spirited citizen, appreciative tributes are paid to his character, indicating the estimation in which he was held by the community at large and the affection with which he was regarded by those who knew him intimately. The happiness and beauty of his home life and his interest in and devotion to the church of which he was for years a member and a liberal supporter, are especially alluded to. On the day of the funeral, when the coffin was borne by men who had grown gray in his employ, some of them having been with him from the first, all public places in the village and the manufacturing were closed out of respect to his memory.

ITEMS.

The Alford & Berkele Company, 77 Chambers street, New York, are issuing an illustrated price list of Guns, Pistols, Ammunition, &c., showing the line of these goods of which they are manufacturers' agents and importers. A variety of Breech and Muzzle Loading Guns are illustrated, with descriptions and list prices; also Florent Rifles, Sporting Rifles, Revolvers and the American Buckle and Cartridge Company's Brass and Paper Shot Shells.

The Dayton Mfg. Company, Dayton, Ohio, manufacturers and dealers in furnishings for railway cars, issue their catalogue No. 15, describing an exceptionally complete line of Car Door Fittings. It includes the various styles of Locks, Latches, Butts and other fixtures for car doors, together with descriptive texts and miscellaneous tables relating to goods in this department.

The Hunter Sifter Mfg. Company, Cincinnati, Ohio, issue an attractive pamphlet entitled "Our Kitchen," which relates to Hunter's Sifters, Cyclone Egg Beater, Favorite Coffee Pot, Scales, &c.

The American branch of the Coventry Machinists' Company, 239 Columbus Avenue, Boston, the head office and works being at Cheylesmore, Coventry, England, issue an attractive illustrated catalogue of the Club Bicycles and Tricycles, in which their different styles of these machines are illustrated and described.

Besides the catalogue of the Udell Works, North Indianapolis, Ind., to which we referred in our last issue, they publish a Ladder catalogue, showing a large variety of Ladders and some miscellaneous articles. It is stated that important additions have been made to their line of Ladders and House Furnishing Goods. Among the specialties represented is the Rope Reel, to which we have before alluded.

In the present condition of the Tack market it will be well for the trade to be on their guard against Tacks of irregular and light weights. For a long time there have been on the market Tacks purporting to be $\frac{1}{4}$ or $\frac{1}{2}$ weight, which when examined came considerably short, but it is now intimated that some well-known concerns are also doing this. The irregularity of the prices of Tacks is thus in a measure explained, as such a shortage will easily enable the quotation of an extra 10 or even 20 per cent. discount.

The striking advertisement on page 32 of the J. L. Mott Iron Works, 88 and 90 Beekman street, New York, in which they call attention to their line of Stable Fittings, will be observed by our readers. They allude to the completeness of their assortment of these goods.

Our readers will observe the announcement on page 20, in which T. Rowland's Sons, Philadelphia, referring to the fire on the 6th inst., which destroyed part of their works, state that they will be in a position to fill orders in about 10 days, and that they can now execute orders for leading sizes from their warehouse.

The trade will learn with regret of the reported assignment of S. G. B. Cook & Co., well-known Hardware Merchants, of Baltimore, Md. They were agents for a number of manufacturers, principally in the Eastern States, to whom their liabilities are supposed to be largely due. They were also intimately connected with the Scott Mfg. Company, and S. G. B. Cook is stated to be president of the Walker Horse Shoe Company.

Attention is called to the advertisement illustrating the Crown and Star Transom Lifters, manufactured by J. F. Wollersak, Chicago, for whom W. H. Jacobus & Co., 90 Chambers street, New York, are agents. These Lifters are intended to meet the demand for a simple and effective low-priced Lifter for operating ordinary Transoms in dwellings and hotels, the sizes which are now on the market being enumerated, with the list prices. It is also intimated that the sizes for store Transoms will soon be ready.

The Maine Mfg. Company, of Fairfield, Me., manufacturers of Clipper and Frame Sleds, have this season being adding several styles to make their assortment more complete, but embodying nothing especially novel. Their catalogue shows the line which they are making, among which they refer to the Boston Clipper and the Maine Cutter as leading goods, the former having been on the market the past two years, and both meeting with a large sale.

The Canton Novelty Cutlery Company, Canton, Ohio, announce a line of Pocket Cutlery in which the coverings of the handles are described as made of transparent celluloid, underneath which on the side of the handle can be placed photographs, society emblems and designs, name and address, business cards, &c. The effect of this decoration is illustrated in their circular, which represents a number of specimen knives, the quality of which is also alluded to. It is intimated that as soon as the company have requisite facilities they will make other novelties which their patent covers, such as Razors, Table Cutlery, Revolver Handles, Umbrella Handles, Door Plates, &c.

The Borthwick Saw-Set Company, Philadelphia, Pa., in their announcement on page 42, call attention, it will be observed, to their Saw-Set, a description of which we gave some time ago. They allude to the increasing sale of this article, on which they are at present behind in their orders, but state that they expect to be in position to supply the goods promptly in a short time.

The Fray Mfg. Company, Bridgeport, Conn., are putting on the market Fray's Patent Disintegrator and Strainer, a device for use in the kitchen for preparing vegetables and fruits for the table.

The Prescott Mfg. Company, Boston, Mass., issue a catalogue describing their Door Hangers, of which a detailed descrip-

tion is given, with directions for applying them. They allude to its cheapness, general utility, ease of movement, freedom from noise and from liability to get out of repair. They state they have recently enlarged their factory and fitted it up with improved machinery, being thus put in a position to fill properly orders intrusted to them.

The imports of Cutlery and Hardware for the week at this port comprised 163 packages, making the total 4828 packages since January 1, as compared with 4180 for the same time in 1885.

We regret to announce the destruction by fire on the 10th inst. of the factory of the Dibble Mfg. Company, Trenton, N. J., manufacturers of Hemacite Door Knobs. In their announcement relating to it the company state that they are making efforts to secure a new working organization, and intimate that in about 10 days they will be in a position to fill orders promptly.

The Ireland Mfg. Company, Cincinnati, Ohio, for whom W. H. Jacobus & Co. are agents, 90 Chambers street, New York, issue additional pages of new goods for insertion in their catalogue No. 4. It comprises a line of Bronzed Metal and Iron Tucker Bronzed Flush Bolts, Genuine Bronze Metal Bell Pulls and Bronzed and Iron Tucker Bronzed Coat and Hat Hooks, Cylinder Night Latch Door Pulls, Shutter Bars, Sliding Door Mortise Latches, Brass Shutter Sheaves and Ornamental Door Pull Handles.

WHAT THE TRADE SAY.

As the condition of trade in different parts of the country is a matter of much interest to both manufacturers and dealers, we take pleasure in giving the following extract from the letter of an Ohio Hardwareman, relating to the condition of things in his section. It will be observed that, while referring to the situation as improved and the outlook as hopeful, the irregularity of prevailing prices is alluded to:

In a general way trade has shown a very steady increase, with this one thing against it, that all combinations made by manufacturers are more or less broken by nearly all jobbers; even in the rock-bound Sand-Paper combination you buy your 25 or 50 reams to put yourself on a good retail basis, when probably the next jobber salesman you meet will sell you three to five reams at the same discount. The general tendency, however, is toward better trade, more of it and better prices. It is true that the manufacturers' staples, such as Files and Screws, Bolts, &c., are mercilessly sacrificed, but the time must of necessity come soon when the slaughter must cease. We know personally of sales of standard makes of Screws at discount of 10 to 15 per cent. discount—prices in a regular way unheard of. We find this fact, that the men in trade, wholesale and retail, feel better over the outlook and are freer and better buyers because of the general stagnation that has ruled heretofore. Taken all in all, the outlook in a Western way may be summed up as exceedingly good. We, as retailers, simply ask deliverance from cutthroat and snide jobbers and a reasonable basis of faith to work on.

Writing from Nebraska, a correspondent, referring, it will be observed, to similar conditions to those referred to in the above letter, says:

Trade is improving nicely here. The feeling among customers seems to be that things have become as low as they are likely to go, and they are more willing to anticipate their wants. Some goods are a little firmer in price, while others remain as low as or lower than ever. Jobbers are anxious to reach out for new trade, and are, indeed, over-desirous sometimes to hold their old customers, which makes strong competition among them to such an extent that margins are sometimes very small. My opinion is that jobbers are not having the profits they should have. They should be more united and stop cutting.

A correspondent in St. Louis, writing in regard to other topics, refers thus to the recent celebration and that city's position as a trade center:

Our conclave parade was eclipsed last night by the Veiled Prophets, who surprised even themselves when they beheld the wonderful effect of their own creation. The result is that, while we have had our city filled with visitors for the past three weeks of the best class of citizens and business men from all over the country, we are now entertaining our country cousins, greatly to their amusement and pleasure, but more so to our profit. No other city in the world offers what St. Louis does, and has done, to divert the channel of trade, and slowly but surely some of the other cities will wake up to find us in the lead when the balance is made up at the end of the year. While this may not seem to you to be directly news, we think it has its important bearings on trade.

We have the following letter, which, besides its reference to trade, gives, it will be observed, a description of the remarkable exhibit of the Simmons Hardware Company at St. Louis:

Indian summer is giving us some beautiful weather, for which we are thankful, as the contrast between it and the hard rain and hail storms of a short time ago is very marked. Trade is good, especially in outside work, in Tinwork and Furnaces. No particular change in prices to note. We are able to give a partial description of the display of the Simmons Hardware Company at the Exposition at St. Louis. It takes up about 25 feet in length of room on the wall and proportionately high. The entire background is dark red. Across the top and bottom is mosaic-work, made of Butts, Japaned and Bronzed, placed alternately. At each end of the display, above the mosaic-work, is an eagle made of Tea and Table Spoons, while between them stands a stalk composed of Carpenters' Tools. Midway

between the top and bottom of the display, at opposite ends, are two large wheels composed of eight Scythies each. Four of these Scythies on each wheel revolve to the right and four to the left. There are also four smaller wheels made up of Revolvers, which revolve just above the mosaic-work. At the bottom of the display is a row of silver points made of Spoons, Tea, Table and Dessert. The center of the display is the part that attracts most attention. At the right-hand corner, at the top, just below the mosaic band, is a rustic farmhouse, with shrubs, &c., around it. This is made of bark and wood. Before the house and running toward the left is a river, with falls and level water. The first section of the river is made of coffin lace, and ends in a fall composed of Auger Bits. Then there is another level place made of Picture Wire, and another fall of Augers. Here the river turns and runs toward the right end of the display. After the second fall the river is composed of Chains. These Chains pass a mill, the wheel of which is made of Knives, Butcher, Table, Pocket, &c., and Revolvers. The Chains run to the extreme right side of the display, and the river ends. The coffin lace at the beginning of the river moves, the Auger Bits of the falls turn, the Picture Wire moves, and the Augers of the second fall turn, and the Chains below the second fall move along with a noise that takes little imagination to make one fancy it sounds like water. Looking at the display from a distance the river is perfect. There are other combinations on the display which fill out and complete it, into the details of which I will not go. A railing incloses a room handsomely carpeted and furnished with commodious chairs for visitors. It is said to be the finest display ever made by the house, and is credited to the skill of Frank Wyman, who has been with the company for years.

Metal Market.

Copper.—Our market has been steady. There are buyers at $11\frac{1}{2}\%$ for Lake Superior on the spot and October, $11\frac{1}{2}\%$ for November, 11.40% for December, and $11\frac{1}{2}\%$ from January to March, while sellers demand about $\frac{1}{4}\%$ more, and for early next year's delivery as much as $1\frac{1}{2}\%$ is insisted upon. The turnover has been small, however, owing probably to the reaction in Chili Bars in London which have fluctuated as follows: October 6 and 7, £42. 5/; October 8, £42. 7/6; October 9, £42. 5/; October 11, £42. 2/6; October 12, £41. 12/6, and this morning, £41. 10. Best Selected did not waver from £45. Messrs. James Lewis & Son, Liverpool, in their circular of October 1, say: "The entailment of the production of Arizona and Montana to the extent of about 3500 tons per month is now beginning to make itself felt here, and we may consequently look for a further diminution of stocks during the present month. American consumers have paid $11\frac{1}{2}\%$ to the Lake Superior companies for their requirements during the months of October and November. This is equal to £52. 8/ per ton, less $2\frac{1}{2}\%$ discount, in New York, and is £4. 15/ per ton above the price paid for the two previous months' supply. This advance is £2. 15/ greater than that which has taken place here since the previous sale was made. American arrivals in England and France for the past nine months are 15,268 tons Fine, against 26,065 tons during the same period of last year, a decrease of 10,797 tons. Messrs. Henry R. Merton & Co., London, October, make the visible supply of Copper in England and France 64,826 tons Fine, against 58,065 in 1885, 41,723 in 1884 and 50,895 in 1883, and the price of Chili Bars £41. 2/6, against £40. 15/ and £42. 2/6 and £63 respectively. Export of Pyrites from Spain first seven months, 416,931, against 487,293 last year; of Ingots, 15,718 tons, against 16,415 at the Metal Exchange; 25,000 lb December Lake Copper sold at 11.35¢.

Tin.—A fair amount of business has taken place in this metal, fully 250 tons having changed hands, principally on speculation, for delivery in November and prompt shipment from London at varying prices from 22.40¢ down to 22.30¢, and up again to 22.40¢, closing, however, at 22.35¢, at which there are rather sellers than buyers. The London market has led the downward movement, owing to heavy shipments reported by cable from the East during the first week of this month, spot Tin dropping to £101. 2/6, and three months' to £102. It, however, remains to be seen whether the high dollar price in the East is causing supplies to be pushed forward for shipment Westward to make up for the falling off during September. The spot quotation in London this morning is £101. 5/ for Straits Tin; futures unaltered at £102. At the Metal Exchange 10 tons October sold at 22.30¢. Tin Plates—Have been more active on the spot, but not higher; for future delivery 10¢ more per box has been paid. Bessemer Steel Bars have advanced 5/ in England and still tend upward. We close as follows, large lines, per box: Charcoal Bright, \$4.60 @ \$5; ditto Tones, \$4.15 @ \$4.30; and Coke Tin, \$4.27½ @ \$4.35, ordinary brands. At Liverpool higher prices are asked; meanwhile the quotation there is 13/3 for ordinary brands Coke.

Lead.—Sale of Common Domestic sum up 300 tons in a retail way at 4.35¢, and 4.30¢, it was rumored, had been accepted for some Lead, but this lacks confirmation. Refined is nominally worth 4½¢, but nothing will be done therein till the White Lead Manufacturers' Convention, now in session at Chicago, shall have decided what course is to be pursued with respect to prices of their article. Soft Spanish has meanwhile declined in London from £12. 12/6 to £12. 10/, and

English Pig from £13. 2/6 to £13. St. Louis quotes at 4.20¢ and Chicago 4.30¢. Export of Pig Lead from Spain during the first seven months 62,565 tons, against 71,138 same time last year, and 67,468 tons in 1884.

Spelter and Zinc.—Although Spelter is rising in Europe the market has remained flat here, with Common Domestic at 4.30¢ @ 4.50¢. Silesian improved from £13. 17/6 to £14 in London; is nominally worth in this market 4.80¢. We quote Bertha Refined 8¢. Sheet Zinc.—There is a fair demand for it at 5.60¢ @ 5.70¢ Domestic. Export of Calamine from Spain during the first seven months, 18,675 tons, against 22,935 in 1885, and 22,161 in 1884.

Antimony.—Cookson's brand has been fairly active, with a good jobbing demand at 9½¢, while Hallett may be called 7½¢, being steady in London at £30.

New York Metal Exchange.

The following transactions are reported:

THURSDAY, October 7.	
25 tons Chili Bars, November.	42.55¢
25,000 lb Lake Copper.	11.40¢
FRIDAY, October 8.	
10 tons Tin, October.	22.25¢
10 tons Tin, November.	22.40¢
10 tons Tin, October.	22.25¢
20 tons Tin, November.	22.75¢
SATURDAY, October 9.	
20 tons Tin, November.	22.90¢
15 tons Tin, November.	22.35¢
MONDAY, October 11.	
10 tons Tin, November.	22.40¢
10 tons Tin, spot.	22.40¢
10 tons Tin, November.	22.40¢
10 tons Tin, November.	22.25¢
15 tons Tin, November.	22.25¢
25 tons Tin, November.	22.35¢
TUESDAY, October 12.	
10 tons Tin, December.	22.40¢
25 tons Tin, prompt shipment.	22.45¢
WEDNESDAY, October 13.	
10 tons Tin, October.	22.30¢
10 tons Tin, November.	22.30¢
10 tons Tin, October.	22.40¢
10 tons Tin, November.	22.40¢
25 tons Tin, November.	22.30¢
25,000 lb Lake Copper, December.	11.35¢

Coal Market.

The Anthracite Coal trade is active, and a good business is looked for through the remainder of the season. The talk now is about another advance, to be agreed upon at a conference this week, but among the more conservative there is a disposition to insist upon full circular prices as they stand, rather than fix upon prices that may not be realized. Despite the admonition conveyed by Governor Pattison and the probability that increased prices will be followed by demands for larger wages, as in the case of the Hazelton operators a week ago, there are some who advise a contrary course. The demands of consumers so nearly correspond with the rate of production that an increased allotment for the current month is spoken of as possible. Some sizes are in short supply, but not to affect manufacturers aside from the deficiency of cars. As the transportation companies in several instances have a coal company as a sort of tender, the suggestion is sometimes heard that the scarcity of cars complained of may be artificial, in the interest of producers. Free-burning White Ash is quoted at Broken, \$3.55; Egg, \$3.80; Stove, \$4.15; Chestnut, \$3.65; Pea, \$2.10. Pittston averages about 10¢ per ton lower, and Reading, Broken and Egg are 20¢ per ton higher.

The total amount of Anthracite Coal sent to market for the week was 687,555 tons, compared with 795,059 tons in the corresponding week last year, a decrease of 107,504 tons. The total amount of Anthracite mined thus far in the year 1886 is 23,197,175 tons, compared with 22,405,613 tons for the same period last year, an increase of 791,562 tons.

The Pennsylvania Railroad reports that the total coal tonnage of this year is 5,632,502 tons. The company's line into the Schuylkill region, with a connection in the Lehigh Valley, will be completed 20th inst.

The shipments from the mines of the Cumberland Coal region for the week ending October 2 were 76,492 tons, and for the year to that date 1,755,957 tons, a decrease of 323,716 tons as compared with the corresponding period of 1885.

Bituminous is about \$3.25 alongside, the abundance of supplies foreboding an advance, which manufacturers in some instances are not slow to perceive. During the week the Clearfield Bituminous Coal Corporation organized at Clearfield, with Wm. D. Kelly, of Elmira, N. Y., as president, and Gen. J. C. Langdon as chairman of the board. The capital of the original company is reduced to \$1,670,000.

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	20.00
Light Copper	18.00
Copper Bottom	16.00
Brass, Heavy	14.00
Brass, Light	12.00
Composition, Heavy	10.00
Lead, Heavy	8.00
Iron Lead	6.00
Zinc	4.00
Wrought Iron	3.00
Light Iron	2.00
Stove Plate Iron	1.00
Machinery Iron	0.50
Grate Bars	0.25
White No. 1	0.05
White No. 2	0.04
Canvases, No. 1	0.03
Canvases, No. 2	0.02
Canvases, No. 3	0.01
Soft Woollens	0.01
Mixed Rags	0.01
Gunny Bagging, No. 1	0.01
Gunny Bagging, No. 2	0.01
Butte	0.01
Book Stock	0.01
Newspapers	0.01
Waste Paper	0.01
Kentucky Bale Rope	0.01
Kentucky Bagging	0.01

Exports.

The following table presents the Exports of Hardware, Iron, Steel, Metals, &c., from the port of New York, for the week ending October 12, 1886:

Dutch West Indies.		Havre.	
Quant.	Val.	Quant.	Val.
Hdw., pkgs., 8	138	Sew. ma., cs., 34	1,549
Sew. ma., case, 1	17	Hdw., cs., 6	389
Danish West Indies.		Guns, case, 1	64
Mf. iron, pkgs., 1	40	Mach'y, pkgs., 2	333
Hamburg.		Porto Rico.	
Quant.	Val.	Quant.	Val.
Ag. imp., pkgs., 17	619	Mf. iron, pkgs., 46	1,189
Sew. ma., cs., 715	17,191	Mf. iron, pkgs., 119	634
Mach'y, pkgs., 11	1,922	W. clo., pkgs., 12	150
Tacks, cs., 4	111	Tinware, case, 1	26
Wringers, cs., 17	315	Ag. imp., pkgs., 5	182
Hdw., pkgs., 71	2,036	Nails, pkgs., 100	233
Clocks, cs., 28	2,044	Clocks, cs., 2	43
Stamped ware		Pumps, pkgs., 2	65
case, 1	51	Boiler, 1	638
Guns, case, 1	81	Mf. iron, pkgs., 34	370
Bremen.		Hdw., cs., 9	201
Quant.	Val.	Nails, cs., 3	15
Clocks, pkgs., 304	6,309	Uruguay.	
Pumps, pkgs., 5	160	Steel, pkgs., 40	470
Ag. imp., pkgs., 2	100	Revolvers, cs., 2	2,105
Mach'y, pkgs., 1	100	Mf. iron, pkgs., 3	189
Iron tanks, 40	1,000	Sht. iron, pkgs., 1	192
Hdw., cs., 19	1,192	China.	
Wringers, cs., 2	35	Hdw., cs., 4	173
Mf. iron, pkgs., 5	125	San Domingo.	
Firearms, cs., 4	411	Hdw., cs., 4	76
Copenhagen.		Clocks, cs., 10	100
Quant.	Val.	Guttenburg.	
Hdw., cs., 1	10	Hdw., cs., 55	1,227
Clocks, cs., 1	10	Rotterdam.	
Liverpool.		Quant.	Val.
Brass g'ds, cs., 2	107	Ag. imp., pkgs., 2	84
Cutlery, case, 1	110	Mach'y, pkgs., 1	130
Copper, cakes, 113	1,748	Brazil.	
Hdw., pkgs., 73	1,807	Hdw., pkgs., 506	5,419
Sew. ma., cs., 294	5,642	Cutlery, cs., 10	467
Saws, case, 1	94	W. goods, cs., 2	35
Mach'y, pkgs., 16	1,502	Nails, kegs., 42	393
Clocks, pkgs., 59	1,452	Cartridges, cs., 19	245
Copper, bars, 413	6,076	Mf. iron, pkgs., 149	3,043
Copper, cakes, 27	8,370	Cotton gins, cs., 33	1,828
Firearms, cs., 5	302	Print, press, 1	98
Shoe nails, cs., 100	400	Buckles, case, 1	330
Clocks, bxs., 185	2,340	Turnables, 2	3,320
Amsterdam.		Stamp'g dies, 1	206
Hdw., cs., 15	275	Mach'y, pkgs., 27	5,336
Mf. iron, pkgs., 1	5	Ag. imp., pkgs., 114	1,308
Antwerp.		Clocks, cs., 33	345
Revolvers, case, 1	190	Guns, cs., 12	174
Glasgow.		Tinware, cs., 2	239
Hdw., case, 1	7	Shoe nails, cs., 5	32
Cartridges, cs., 4	105	Pumps, pkgs., 22	677
Arms, case, 1	125	Tinware, cs., 14	457
Hull.		Tacks, cs., 19	178
Ag. imp., pkgs., 19	220	Revolvers, case, 1	198
London.		Agate ware, cs., 2	75
Hdw., pkgs., 179	4,916	French West Indies.	
Wringers, cs., 1	11	Tinware, cs., 4	72
Mf. iron, pkgs., 58	1,814	Sew. ma., cs., 8	150
Clocks, pkgs., 512	6,336	Hdw., cs., 1	130
Saws, case, 1	30	Lisbon.	
Ox. zinc, bbls, 100	797	Metal gds, case, 1	34
Cartridges, cs., 11	290	St. imp' d ware, 1	45
Sew. ma., cs., 330	9,768	case, 1	45
Ag. imp., pkgs., 35	1,470	Hdw., cs., 18	500
Mach'y, pkgs., 47	4,879	Ag. imp., pkgs., 3	52
Pumps, pkgs., 5	361	Clocks, pkgs., 46	322
Guns, case, 1	210	Mexico.	
Scales, cs., 28	728	Ag. imp., pkgs., 12	366
Plated ware, 3	287	Hdw., cs., 13	478
Wire cloth, cs., 3	110	Railroad cars, 7	2,365
British Guiana.		Cartridges, cs., 11	215
Mach'y, pkgs., 1	35	Locomotive, 1	6,300
British West Indies.		Railroad cars, 3	2,367
Pumps, pkgs., 2	55	Mf. iron, pkgs., 1	100
Hdw., cs., 45	660	Clocks, pkgs., 2	165
Tinware, cs., 9	95	Tacks, cs., 12	70
Cartridges, cs., 4	121	Table expand., 1	70
Windlasses, 1	48	case, box, 1	10
Cutlery, cs., 2	47	Sew. ma., cs., 41	1,026
Sew. ma., cs., 6	55	Mach'y, pkgs., 18	1,028
Mf. iron, pkgs., 60	671	Metal g'ds, cs., 2	153
Nails, kegs., 125	392	Cutlery, cs., 41	795
Shot, bags, 12	17	Pumps, pkgs., 6	280
Vol. metal, cs., 1	137	Boiler, 1	700
Ag. imp., pkgs., 5	54	Argentine Republic.	
Nails, cs., 3	21	Mf. iron, pkgs., 73	4,121
Windmill, 1	91	Clocks, cs., 10	2,422
Newfoundland.		Pumps, pkgs., 2	44
Forges, 6	108	W. mills, pkgs., 73	2,419
Sew. ma., cs., 3	100	Ag. imp., pkgs., 218	3,269
Vol. metal, cs., 1	114	Hdw., cs., 330	8,266
Mf. iron, pkgs., 1	70	Mf. iron, pkgs., 3	175
Nova Scotia.		Sew. ma., cs., 131	2,179
Tinware, case, 1	141	United States of Colombia.	
Hdw., cs., 3	328	Mf. iron, pkgs., 522	8,845
British Australia.		Mf. iron, pkgs., 361	2,859
Pumps, pkgs., 6	328	Cutlery, pkgs., 41	1,341
Mf. iron, pkgs., 92	1,480	Ag. imp., pkgs., 19	115
Air guns, cs., 3	367	Firearms, cs., 7	261
Tacks, cs., 3	85	R. metal, cs., 4	100
Wringers, cs., 45	701	Tinware, cs., 28	508
Forges, case, 1	42	Jacks, cs., 8	500
Nails, cs., 7	300	Shot, case, 1	17
S. drills, case, 1	90	Tin shingles, cs., 359	1,036
Sew. ma., cs., 10	385	Rivets, kegs., 32	185
Hdw., pkgs., 899	30,971	Clocks, cs., 2	40
Saws, cs., 31	975	Sew. ma., cs., 40	818
Ag. imp., pkgs., 35	1,679	Mach'y, pkgs., 101	7,473
Nails, kegs., 90	312	Quicksilver, 1	250
Mach'y, pkgs., 39	3,154	Carbines, cs., 9	324
Clocks, cs., 2	95	Nails, cs., 72	311
Mf. copper, cs., 2	170	Iron, pkgs., 2,871	7,322
Cuba.		W. coolers, cs., 10	155
Mach'y, pkgs., 230	7,006	Nails, kegs., 38	185
Spring, case, 1	31	Steel, pkgs., 34	507
Metal gds, case, 1	62	Pumps, pkgs., 4	408
Tinware, cs., 7	133	Wire cloth, case, 1	16
Saws, cs., 2	18	Central America.	
Nails, cs., 37	259	Mf. iron, pkgs., 11	45
Nails, pkgs., 4	132	Sew. ma., case, 1	14
Sew. ma., cs., 88	4,208	Japan.	
Tacks, cs., 3	41	Hdw., cs., 5	322
Tin plates, cs., 2	55	Venezuela.	
Forges, case, 2	550	Hdw., cs., 33	429
Boilers, 2	3,259	Mf. iron, pkgs., 30	325
Clocks, pkgs., 12	361	Mach'y, pkgs., 35	4,247
Hdw., pkgs., 119	7,277	Sew. ma., cs., 3	93
W. gds, cs., 3	24	Clocks, cs., 9	93
W. goods, cs., 2	267	Nails, kegs., 21	80
W. goods, cs., 198	288	Nails, kegs., 21	80
Cutlery, cs., 4	84	Steel, pkgs., 3	98
Steel, pkgs., 3	98	Valves, case, 1	30
Valves, case, 1	30	Arms, case, 1	42
Arms, case, 1	42	Pumps, pkgs., 6	180
Pumps, pkgs., 6	180	Wire cloth, cs., 8	310
Wire cloth, cs., 8	310	Ag. imp., pkgs., 3	45

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending October 13, 1886:

Hardware.		Hartley & Graham.	
Quant.	Val.	Quant.	Val.
Brown Bros. & Co.	92	Arms, cs., 30	
Case, 6	14.00	Mdse., cs., 11	
Buckley J. H. & Son.		Judd H. L. & Co.	
Mach'y, case, 1	0.03	Nails, cs., 2	
Clark G. A. & Bro.		Karner Ph. H.	
Mach'y, cs., 308		Machines, cs., 2	
Davies, Turner & Co.		Kastor A.	
Case, 1		Mdse., cs., 6	
Field Alfred & Co.		Knauth, Nachod & Co.	
Mdse., cs., 6		Mach'y, pkgs., 2	
Case, 2		Case, 30	
Guns, cs., 2		Lau J. H. & Co.	
Fitzpatrick J.		Newton & Shipman.	
Nails, bbls., 2		Files, cs., 2	
Folsom H. & D.		Case, 2	
Arms, cs., 7		Patton, Vickers & Co.	
Gurney Fred B.		Case, 2	
Cutlery, cs., 2		Roy R. & Co.	
Case, 2		Mach'y, box, 1	
Case, 2		Mach'y, box, 1	

Sellers W. B. Cutlery, case, 1
Schoverling, Daly & Arms, cs., 11
Schoverling, Daly & Arms, cs., 11
Mdse., cs., 7
Underhill, Clinch & Co. Cases, 2
Vom Clegg & Co. Mdse., cs., 47
Wiebusch & Hilger, Mdse., cs., 10
Arms, cs., 2
Witte John G. & Bro. Cutlery, cs., 2
Order.
Arms, pcs., 6
Mach'y, cs., 10
Abbott & Co. Spiegel, lot, 1
Nails, kegs., 2
Baring Bros. & Co. Bundles, 2770
Coils, 1822
Brown Bros. & Co. Rivet rods, tons, 73
Coddington T. B. & Co. Sheets, bbls., 188
Crocker Bros. Pig tons, 300
Ferro iron, tons, 26
Spiegel, lot, 1
Spiegel, tons, 130
Davies, Turner & Co. Sheets, bbls., 188
Drexel, Morgan & Co. Pig tons, 300
Goldschmidt, Chas. J. Rods, coils, 7551
Henry A. T. Pig tons, 100
Lazard Freres. Wire rods, pkgs., 957
Rods, coils, 7551
Lillienberg N. Bars, 75
Lundberg Gust. Coils, 438
Meyers, Desp. Co. Wire, coils, 84
Byrne & Co. Tin plates, bxs., 1000
Caswell C. A. Silver-lead ore, cks., 1
Dickerson, Van Dusen & Co. Tin plates, bxs., 1550
Field Alfred & Co. For caps, cs., 2
Gould R. S. Brass foundings, cs., 6
Hendricks Bros. Tin, bbls., 25
Keane & Co. Old metal, bbls., 3
Lamarca A. & Sons, Mdse., cs., 25
Lazard Freres. Tin, bbls., 478
Phelps, Dodge & Co. Tin plates, bxs., 375
Pim, Forwood & Co. Old copper, bbls., 9
Old metal, drum, 1
Schepp L. Old metal, bbls., 2300
Schoverling, Daly & Gale. Per. caps, cs., 4
Order.
Tin plates, bxs., 744
Antimony, bxs., 15
Tin, slabs, 1119
Tin, cs., 15
Lead, pkgs., 814
Tin, ingots, 146
Quicksilver, bottles, 72
Nickel, cks., 5
Spelter, plates, 4192

The imports of Cutlery, Hardware and Metals at this port for the week ending October 8 were as follows:

	Quantity.	Value.
Anvils	144	\$902
Antimony	270	1,945
Brass goods	78	7,555
Bismuth	8	4,091
Bronze	128	14,445
Chain and anchors	48	1,992
Clocks	99	8,614
Copper	426	426
Cutlery	191	38,842
Dutch metal	15	2,350
Guns	146	18,326
Hardware	1,000	10,000
Iron, pig, tons	100	1,000
Iron, sheet, tons	100	1,000
Iron, spiegel, tons	100	1,000
Iron, ore, tons	100	1,000
Iron, other	100	1,000
Lead, pigs	100	1,000
Machinery	100	1,000
Metal goods	100	1,000
Nails	100	1,000
Necklaces	100	1,000
Nickel	100	1,000
Old metal	100	1,000
Platina	100	1,000
Percussion caps	100	1,000
Pins	100	1,000
Regulus antimony	100	1,000
Saddlery	100	1,000
Steel	100	1,000
Spelter, lb.	100	1,000
Type metal	100	1,000
Vanadium	100	1,000
Vin, slabs, 5,816		
Wire	100	1,000
Zinc, oxide	100	1,000

L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1839.




Patented July 6, 1880. Patented July 8, 1884.
Registered March 31, 1874.

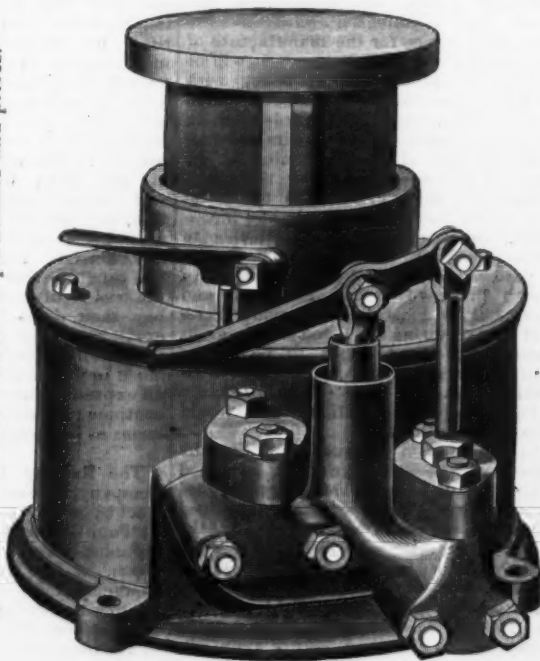
Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

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Nos. 20 to 26 MAIN STREET,
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For pressing Boxes into Hubs, and for pressing on Hub Bands for Farm and Freight Wagons.



Press of 50-Ton Capacity.

American Manufacturing Company,
PHILADELPHIA,



MANUFACTURERS OF THE
ONLY PERFECT ADJUSTABLE
Sliding Door Hangers,

ONLY PERFECT
TRANSOM LIFTER,
ADJUSTABLE SAW VISES, SPOKE
SHAVES, SPOKE TRIMMERS,
BENCH HOOKS, HOLLOW AUGERS,
EXCELSIOR CAN OPENERS,

Patent Braided Cotton
CHALK LINES, &c.

FOR SALE BY
LLOYD & SUPPLEE
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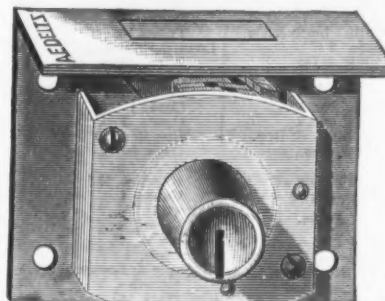
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LAMP STOVE.**
Well Advertised,
Sells Quick and
Pleases Everybody.
Why not try them?
The ALFORD &
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Selling Agents,
Pat. Nov. 14, 1876, & July 11, 1880. Others Pending.
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MANUFACTURER OF
REFINED BAR IRON.

Also as a Specialty
Bolts, Nuts, Washers, Rivets,
LAG SCREWS, TURNBUCKLES,
Rods and Forgings for Bridges and Buildings,
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ORE JIGS.
The attention of Hematite ore miners is called to our new Jig. The simplest and most effective separator now in use.
McLANAHAN & STONE,
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Manufacturers of Ore Washers, Screens, Elevators, Conveyors, any general Ore Mining Machinery.

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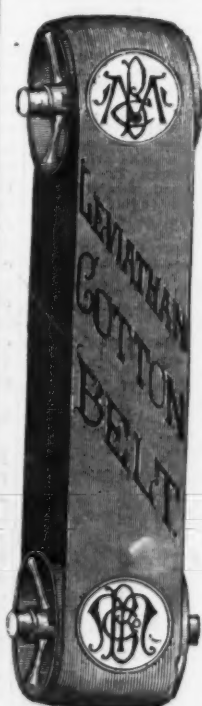


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ALWAYS GIVES THE
UTMOST SATISFACTION.

Main Belting Co.,
Manufacturers of
THE LEVIATHAN
COTTON
BELTING.

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Strength, Durability and
Cheapness.
Made to any Length,
Width and Strength.
Main Driving Belts.
Guaranteed to Run
Straight, Even Through-
out.
No Cross Joints, Un-
affected by Damp.
Clings well to the Pulley.
Has no equal. In fact,
is THE BELT.

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COMPANY,
S. W. cor. Ninth and Reed
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Also
248 East Randolph St.,
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THE CHAMPION LEVER
BLOWERS & FORGES

Are the Leaders of the World.



An entirely
novel
construction.
They have
no equal. No
Cog Wheels, Rat-
chets, Pawls,
Gum Balls or
other Friction
Devices to wear
out in a short
time. Easy Mo-
tion, Powerful
Blow, Noiseless
and Durable.
Guaranteed to
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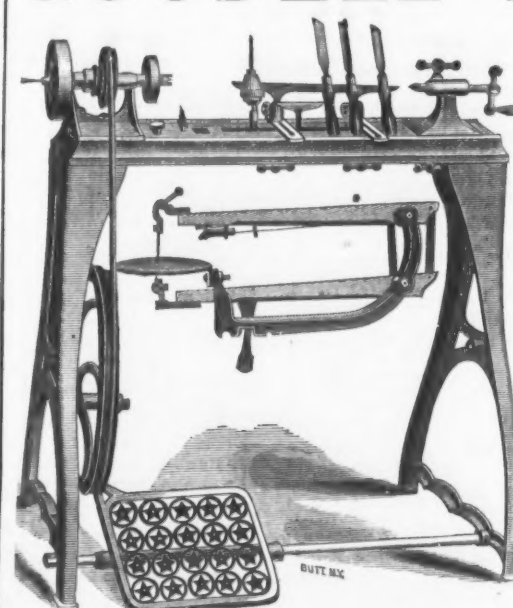
CHAMPION
BLOWER &
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WHITE MOUNTAIN FREEZER.



CLINE'S FOOT HEATERS AND FUEL

Patented
U. S. and Canada,
Nov. 10, '85; Mar. 31,
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CLINE MFG. CO.,
42 and 44 W.
Monroe St., Chicago
No Oil, No Smoke, No Smell, No Blaze, No Danger.



Many kinds of Scroll Saws have been put on the market by ourselves and other manufacturers during the past twelve years. Of these only a few have proved good enough to remain in demand. The call now is for a well-made, practical machine, and all second-class ones are of slow sale.

Those who want a good Lathe with "C" Sawing Attachment and all Tools and Improvements to the very latest moment will buy the Goodsell Lathe.

Those who want only a Scroll Saw with Drilling Attachment, Rubber Blower and Lever Clamp will prefer the Rogers Saw.

These two machines are taking the place of all others and are now the most in demand throughout the world.

No dealer can make a mistake by laying in a stock of them. About Christmas time they are wanted in every town, and will make business lively at this otherwise dull season.

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Price of Goodsell Lathe,
complete, \$12.00.

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MILLERS FALLS CO.,
74 Chambers Street, New York.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
WAREHOUSE
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THE SEIDEL & HASTINGS CO.
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We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. R. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,808 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.

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POTTSVILLE, PA., Manufacturers of all kinds of
STRUCTURAL STEEL AND IRON,
Viz., BEAMS, CHANNELS, TEES, ANGLES, PLATES AND BARS; Also STEEL
AND IRON AXLES FOR FREIGHT AND PASSENGER CARS.

This Steel is manufactured by the CLAPP-GRIFFITHS process, and is specially adapted, in addition to the above, for Boiler and Bridge Rivets, Wire Rods, Nail Plates, &c. &c. Our Mild Steel is well adapted for use in place of the best quality of Wrought Iron; where a greater strength and ductility is required, it welds readily as iron. Also Billets, Slabs of all sizes and any desired temper. Shafing of all sizes in stock, from which prompt shipments can be made.

Brewery, Malt and Ice House Construction a Specialty.

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GREY IRON SHELF HARDWARE.

Our Specialties: Axle Pulleys, Well Wheels, Grind-
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Handles, Stove Lifters and Post Mauls.

Works: 11th and Papin and 12th and Gratiot Streets, St. Louis.

PURE TURKISH EMERY.
WALPOLE EMERY MILLS,
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MECHANICAL.

Fan Engine and Fan for Torpedo-Boats.

We reproduce on this page from *Engineering* a sectional elevation and an end view (the latter with steam-chest cover removed) of the fan engine and fan used by the well-known English builders Messrs. Yarrow in their first-class torpedo-boats, to maintain the air pressure in the stokehold, by means of which the draft of the furnace is augmented. The arrangement is very similar to that first adopted by Messrs. Thornycroft & Co. A portion of the air is drawn from

possible for the boiler to have a pressure on the outside, but it is not possible to produce any on the inside. Should there be any leakage of water from the boiler the deficiency is made up automatically by a very simple contrivance. On the side of the condenser casing is a small water-pocket made to receive the discharge from the air pump. From this water-pocket the water enters the boiler through a small float chamber, the float maintaining the water level constant. A communication is made between the small water-pocket and the condenser casing. As long as the quantity of water entering this pocket is the same as the quantity leaving it to enter the boiler the water level remains

the fire-box of a locomotive boiler does by far the greatest portion of the work in raising steam. The boiler under notice has no heating surface except that of the fire-box, but the fire-box is so constructed that a great portion of the heat of the spent gases is trapped by the green fuel which is approaching the condition of combustion in the fire-box. So completely is the waste heat utilized that it is possible to put one's hand into the top of the boiler and take out lumps of coke, even when the coke is nearly half-way down in the fuel space. The author has not had time to make careful quantitative experiments as to the value of the heating surface and the economy of this form of boiler,

successfully by electricity, so it is claimed. It has now been at work nearly a month. In the basement is a 5-horse-power Sprague electric motor, scarcely 3 feet tall, and covering a floor space not 3 feet square. This runs noiselessly, and at a constant speed, but the speed dropped slightly for a moment when a heavy load was thrown on, regaining the normal speed at once. The power from the motor is here used to lift the elevator directly, by means of the ordinary belting, but it might be used for pumping water for hydraulic elevators under either the tank or the air-pressure system. The motor runs all day, but only consumes an appreciable

any angle. It can be held in any position on the trunnion by clamping the body of the vise with the two nuts shown in the cut. A graduated dial on the trunnion marked "degrees" gives the angle to which the vise can be thrown, facilitating the milling or planing of pieces at an angle. The jaws, of hardened steel, open 8 inches, with a depth of 2 inches.

Machinery of the Yacht Alva.

The new steam yacht Alva, built for Mr. William K. Vanderbilt, by the Harlan & Hollingsworth Company, of Wilmington, Del., is entirely of the best quality of steel—both ribs and sheeting. She is 285 feet long over all, 252 feet on the load line, 32-foot 3-inch beam, and 21-foot 6-inch depth of hold. She is built for classification in the highest class of the English Lloyd's. She will be rigged as a three-masted schooner, with square topsail on the foremast. The propelling machinery will consist of an inverted double-acting surface condensing three-cylinder compound engine, the high-pressure cylinder being placed in the center and the low-pressure cylinders at each end. The high-pressure cylinder is 32 inches in diameter, and the low-pressure cylinders each 45 inches; the stroke is 42 inches. Besides this engine there will be reversing engines, pumping engines, turnover engines, engines for working the steam steering gear, windlasses and electric-light machines, and for numerous other purposes in handling the ship. The propeller is a solid casting of manganese bronze made in Scotland. It has four blades, and is about 10 feet in diameter. There are two boilers of the circular single-end horizontal tubular pattern, with four patent corrugated furnaces in each. They are made of the finest steel plates, 1 inch thick, and are 17 feet in diameter and 10 feet long. They will stand back to back, with a fireroom at each end. They are built to stand a working pressure of 100 pounds to the square inch. Besides these there is a donkey boiler for working the donkey and hoisting engines when steam is not up in the main boilers.

Ice Machines.

In his interesting address before the Section of Mechanical Science and Engineering of the American Association for the Advancement of Science, Vice-president Octave Chanute gave some interesting information in tracing the ice machine through the various stages of evolution to its present state of development. Beginning with the purely hypothetical statement of the production of a reduced temperature by means of combustion of fuel, Professor Cullen, of Glasgow, in 1755, declared that quicklime and spirits of sal ammoniac constituted the best method of producing artificial cold. These discoveries remained mere laboratory experiments until 1834, when Jacob Perkins made the apparatus for producing ice by the volatilization of sulphuric ether. Following him were other inventors, each adding their moiety to the experience and sum of human knowledge upon the subject; among them were Twining, Leslie, Valance, Harrison, Pontifex, Siebe, Windhausen, Tellier, Carré and Pictet. In 1869 an inventor determined to produce a successful ice machine, and read everything on the subject contained in a public library, learning the methods employed by his predecessors and the elements of their success and failure. This logical method of procedure resulted in the invention of the anhydrous ammonia process, which was put into practical operation in 1874. Another successful ice machine was produced a few years later, as the joint result of work by a practical mechanic, a chemist and a patent solicitor. There are several hundred ice machines used in the United States, and they have reached a degree of economy which may be estimated by the statement that as much refrigeration is produced by the combustion of 1 ton of coal as from the melting of 20 tons of ice. This same principle of refrigeration by the expansion of gas is used by brewers around Pittsburgh, U. S. A., where the refrigeration in the expansion of natural gas is used for cooling breweries. At the governor-valves used for reducing the pressure of natural gas at the entrance to works

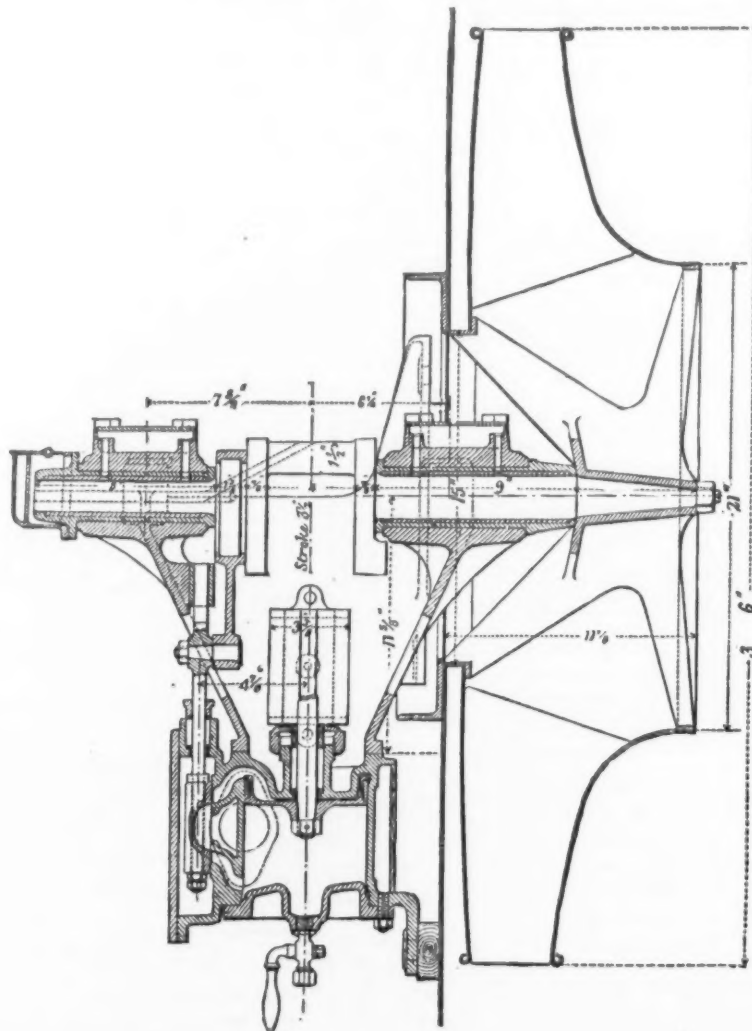


Fig. 1.—Section and Elevation.

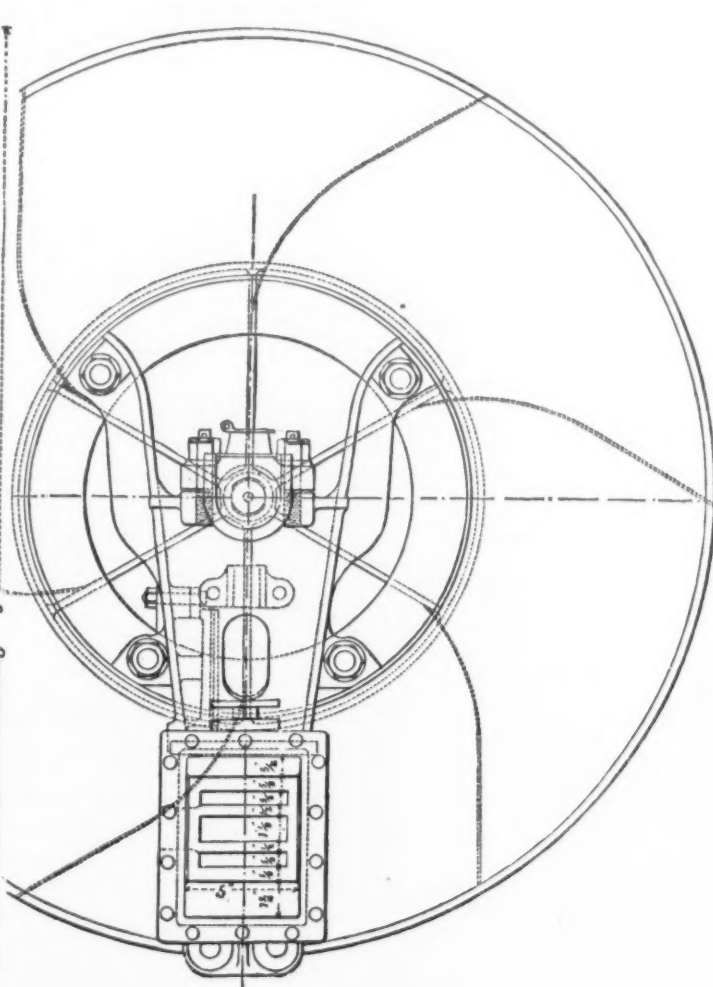


Fig. 2.—Side Elevation.

FAN AND ENGINE FOR TORPEDO-BOATS.

the engine-room, but the bulk is taken from the other side of the fan, which is in direct communication with a deck cowl. This plan tends to balance the end thrust on the fan spindle, and by it a good means of ventilating the engine-room is secured. The lubrication of the crank-pin, eccentric, &c., is obtained through a hole in the shaft, the centrifugal motion causing a continual supply of oil to find its way to the working parts. The after extremity of the shaft is completely immersed in an oil-box. In some of Messrs. Yarrow's second-class torpedo-boats they adopt unpacked piston-valves, an arrangement which they consider an improvement on the slide-valve. The fan is made of steel plates, 18 B. W. G., which are hammered cold into shape.

The Davy Motor.

In a paper recently read before the Mechanical Science Section of the British Association for the Advancement of Science Mr. Davy thus described the domestic motor designed by him:

Briefly stated, the motor is a steam engine working with a negative pressure, and therefore impossible of explosion. It is also automatic in its functions. In the ordinary form of motor the boiler consists of a cast-iron shell with an internal fire-box, the space between the fire-box and shell being filled with water up to a certain height. In the space forming the upper part of the boiler is inclosed a steam cylinder. The piston-rod passes out through the boiler, and is attached to a crosshead giving motion to a crank-shaft carrying a fly-wheel. At the back of the boiler is an upright casting containing a surface condenser. The condenser is surrounded with water, and at the bottom is connected to a small air pump employed to pump the water formed by condensation from the condenser, and to return it again to the boiler, so that the same water is used over and over again. At the top of the boiler is an escape-valve communicating with the chimney. The water is raised to boiling point as it is in an ordinary tea-kettle. If the engine is not at work the steam escapes up the chimney without producing any pressure in the boiler whatever. The steam cylinder is then completely surrounded with steam, and on turning the fly-wheel round by hand the forward movement of the piston causes the steam to enter the cylinder. On the return of the piston the steam is discharged into the condenser and becomes condensed, forming a vacuum, on which depends the whole power of the engine. Immediately the vacuum is formed the engine commences to work of its own accord. The vacuum obtained is from 26 inches to 28 inches of mercury, equivalent to 13 pounds to 14 pounds per square inch on the piston. A throttle-valve is placed over the admission port to the cylinder, actuated by means of a governor. It will be noticed that the engine can work even when the internal pressure is below that of the atmosphere. The object of the valve on the top of the boiler is not that of a safety-valve, but of a non-return valve, to prevent the admission of air when the pressure is below that of the atmosphere. It is

unvariable; but should more water enter the boiler the level in the pocket would fall below that in the condenser casing, thereby causing the deficiency to be supplied from the latter. It will thus be seen that the contingency of a loss of water from the boiler by leakage is provided for, and is supplied automatically.

All the functions of the engine are automatic, with the exception of feeding the fire. The fire-box is made large, so that the fire does not require to be frequently stoked. It will be obvious enough that, assuming the boiler to be exposed to an internal pressure of 2 or 3 pounds to the square inch, it would be beyond all risk of explosion. Such a pressure is sometimes required, especially for dairy purposes, for steaming cattle food, for warming buildings and for other purposes; but the providing of such a pressure, without disturbing the absolute certainty of the automatic feed, was a difficulty which the author had to overcome. A little weight placed on the relief-valve would enable one to produce an internal pressure, but an ignorant attendant might replace the little weight by a big one, and thereby produce a dangerous pressure. The little weight might be placed in a position where it could not be tampered with, but even then it would be almost impossible to make it so accurate that it would not produce a pressure greater than the feed pressure, thereby stopping the automatic feed. Now, this difficulty has been successfully overcome by loading the escape-valve with the feed-water column. The condenser cistern is carried up above the top of the boiler for 3 or 4 feet, sufficient to give the necessary head, and the steam from the boiler, when it escapes, is made to escape into the condenser casing against the water column instead of into the chimney. It will be seen that, as the water level in the boiler is below the escape-valve, there is always more pressure feeding the boiler than there can possibly be steam pressure in the boiler; and it is impossible to produce a steam pressure in the boiler greater than the water column in the condenser cistern. This arrangement enables one to provide a very small pressure, but sufficient for steaming purposes. The author then proceeded to explain the construction of the other modification of the motor in which the boiler is separate from the engine, and has a large fuel space, only requiring addition of fuel at long intervals—say, once in eight hours. A section of this modification of the motor is shown in the annexed engraving. It will be seen that the boiler contains a large vertical column of coke, which burns at the bottom, the coke above falling down by its own weight as the bottom portion is burnt away. The weight of the column crushes the ashes through the spaces between the fire-bars, and the combustion is thereby maintained continuous. The column of coke is made sufficiently large and sufficiently high to keep up a constant rate of combustion for, say, six or eight hours. It will be interesting here to notice the fact that the total efficiency of the heating surface of the boiler is greater with this mode of firing than with any other.

It has generally been well known that

but he is convinced from general observation that it is far more efficient and economical than the ordinary form. One great reason lies in the fact that the heat is all imparted to the boiler surfaces by direct contact of solid fuel, or radiated from the solid fuel which is almost touching the plates. It is the author's intention to carry out careful experiments with this form of boiler. The motor itself, which is used in connection with the separate boiler, is in general principle similar to that of the self-contained motor. It only differs in construction. For simplicity's sake it is made single-acting. One great reason for making it so is that it obviates the necessity of adjustable bearings in the connecting-rod and crank-shaft. The condenser is placed in the base of the motor, and is provided with an air pump of similar construction to that used in the self-contained motor. For the purpose of readily starting the motor a small hand pump is combined with the air pump, by means of

amount of electric energy when the elevator is raised. The throwing on of the belt by means of the ordinary wire rope had no perceptible effect on the motor. It is a 1500-pound elevator, used for freight, and runs at a speed of from 40 to 50 feet a minute, going up five or six stories. The power comes from the Edison central station, 200 feet away. Motors operated from this same station are now daily running ventilating fans, printing presses, circular saws, sewing, buffing and other machines in the neighborhood. It is expected that 20 elevators will soon be running by electricity.

Boring Bar and Universal Vise Chuck.

Messrs. Pedrick & Ayer (L. B. Flanders Machine Works), of Philadelphia, Pa., are putting on the market two new specialties, which we illustrate.

One of them is a boring bar (Fig. 1) for lathe use, and is built of any size required.

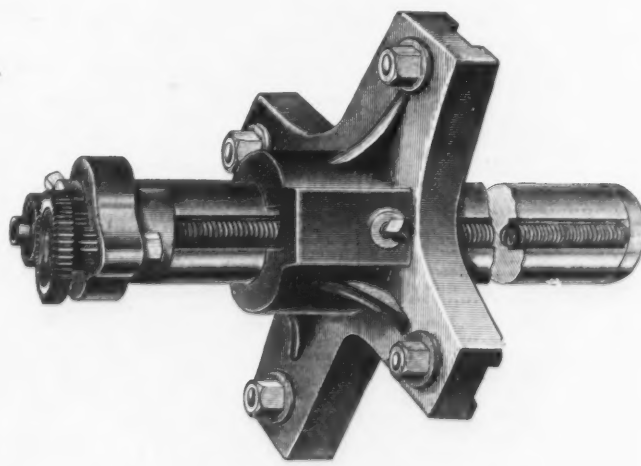


Fig. 1.—Boring Bar for Lathes.

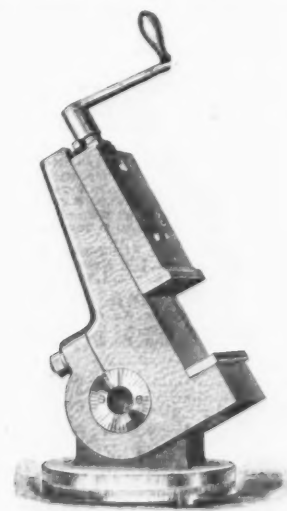


Fig. 2.—Universal Vise Chuck for Milling Machines, Planers, Drill Presses, &c.

NEW TOOL SPECIALTIES MADE BY PEDRICK & AYER, PHILADELPHIA, PA.

of which the vacuum may be obtained without pulling round the fly wheel. A few strokes of the hand pump secure sufficient vacuum to enable the motor to start. Sometimes a circulating pump is combined with the air pump, enabling the motor to draw its supply of condensing water from a well, pond, stream or other convenient source of supply. With this form of motor it is quite possible to supply the hot water tanks of a house with hot water from the condenser, and also steam at a slight pressure, sufficient for warming purposes.

An Electric Elevator.

In the building of the Union Institution for Savings, says the Boston Journal of Commerce, is the first elevator in Boston run

It has hardened centers, automatic constant feed of cut gears, with steel feed-screw, and is carefully fitted up with a bronze thrust bearing, keeping out all lateral motion. The builders furnish also suitable cutter-heads with their adjustable tool-holder. All bars are accurately ground to gauge.

Fig. 2 represents Cosgrove's Universal Vise Chuck for milling machines, planers, shapers, drill presses, &c. This tool will be found of the greatest value, because of its great range of positions. It is adapted to swing from a horizontal to a vertical plane, or at any angle in that plane. A graduated plate with a central stud fills the hole in the base of the vise, enabling it to be set at

to a suitable working pressure the cooling is sometimes so rapid as to render the friction of the valve-rods so great that the apparatus would not be operative were it not surrounded by steam-pipes or immersed in water kept warm by steam.

A Buenos Ayres paper says more than 20,000,000 sheep, or 12 per cent of all the herds in the Province, have died from disease and exposure, entailing a loss of £4,500,000.

Utica is preparing to give an exhibition of the industrial and mechanical interests of the city some time next month.

HARDWARE.

Cow—		Cards.
Common Wrought.....	dis 60@10%	Horse and Curry.....dis 10 @ 10%
		Cotton.....100%

[illegible]

Large Electro-Plating Materials.

Established 1863, Incorporated 1881.

SOLE MANUFACTURERS OF

The American Electro-Plating Machine.

BEST PLATING MACHINE IN THE MARKET,

HEADQUARTERS FOR EVERYTHING IN THE PLATING AND POLISHING LINE

"THE LARGEST MANUFACTURERS IN THE WORLD"

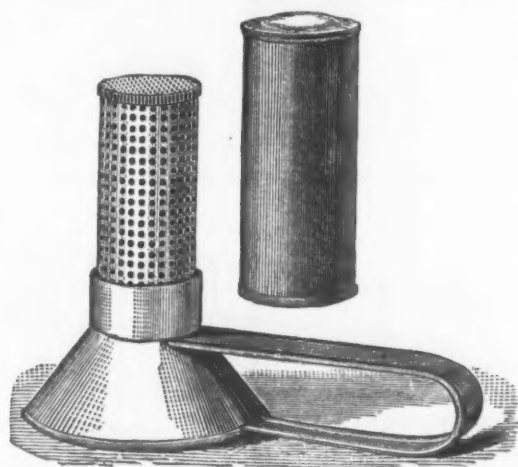
Nickel Anodes, Nickel Salts, Patent Muslim Buffs, Polishing Lathes, Polishing Fat, Polishing Rouges, Polishing Compositions, Walrus Leather Wood Emery-Wheels, Platers' Brushes, &c., &c.

ZIEGLER & ELECTRICAL CO., Works, 538 to 564 W. 16th Street,
Offices, 36 to 40 11th Ave., New York, U. S. A.

NOVELTIES.

Safety Lamp.

We illustrate below a safety lamp or device for lighting up which is manufactured by Edward H. Jacobs & Co., Danielsonville,



Safety Lamp.

Conn. It is intended for lighting gas in factories and other buildings where it is dangerous to carry about an exposed light. The cut shows the lamp with the extinguisher off and ready for use. The lamp is held over the gas jet, and when the gas enters the perforated protector it is instantly ignited. These lamps are described as made in a substantial manner, and their utility as a safeguard against fire is mentioned.

The Victor Frame Pulley.

The Palmer Mfg. Company, Troy, N. Y., are making this article, which is illustrated in the accompanying cut, Fig. 1. This pul-

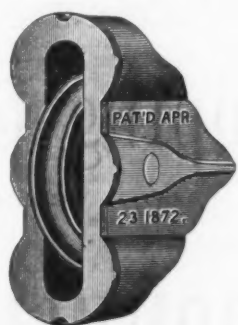


Fig. 1.—The Victor Frame Pulley.

ley, which is referred to as a companion for the company's Common Sense Pulley, is designed for frames for thin sashes where a narrow mortise is necessary. One of its special features is the chisel edge on the case, adapting it for cutting its own mortise. The manner in which this is done is indicated in Fig. 2. Tubular swells on the case closely fit the auger holes in the jams, the face-plate being composed of corresponding segments of circles. The pulley has also marking spurs on one edge of its face, as shown in Fig. 1, by means of which the centers for the auger holes are readily laid off on the wood. If deemed necessary brads may be driven diagonally in the jam, the heads fitting in the countersinks in the ends of the pulley. The manufacturers allude to the following points of excellence in this pulley: That only three holes are required, in boring which for 1 1/4 and 2 inches a 3/4-inch bit is used; that the face-plate gives

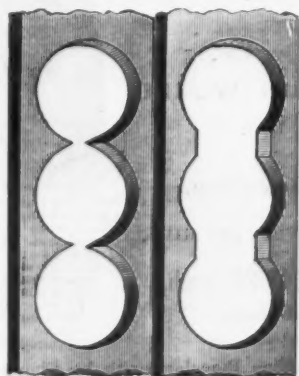


Fig. 2.—Mortise for Victor Frame Pulley.

it a better appearance than pulleys having none; that it is held more firmly in the frame than other pulleys not fastened with screws; that it can be applied to the frame very rapidly. It is made in four sizes, 1 1/4, 2, 2 1/4 and 2 1/2 inches.

The Hook Door Spring.

This article, which is represented in the accompanying illustration, is manufactured by the inventor, W. S. Barlow, Paterson, N. J. It consists, it will be seen, of three pieces, the stud or bracket A, which is attached to the hinge side of the door; the spiral spring D, which with the loops at either end is 7 inches long, and the hooked bar B, by which the spring is connected to the door frame. This hook bar is 5 inches long, and has five hooks by the end, one of which is attached to the screw C in the door frame, the loop on the spiral spring passing over one of the other hooks, thus giving the desired tension to the spring. In the illustration the spring is attached to the second hook, the remainder of the hooked bar being inside the spring. It will be seen that the spring can be tightened or loosened by simply attaching it to one or other of the

hooks, and it will also be observed that the force of the spiral spring may be increased or diminished according to the position on the door of the stud A, by which the leverage exerted when the door is open is regulated. It will thus be seen that the spring admits of varied adjustment, according to

the requirements of its use. Its simplicity and the ease with which it may be applied, no tool but a screw-driver being requisite for this purpose, and no mechanical skill being required, are points alluded to as advantages connected with its use. The fact that the spring is made of crucible spring steel is also mentioned. This article is

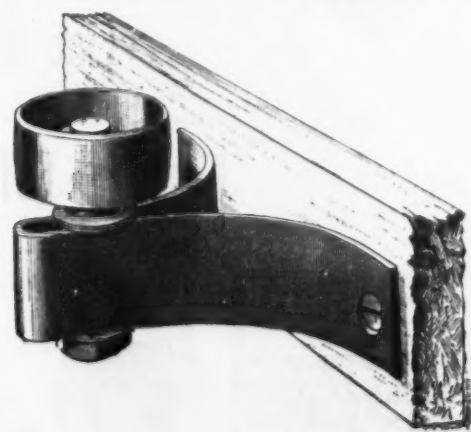


The Hook Door Spring.

made in two sizes, No. 1 with strength sufficient for most doors, and No. 2 for large heavy doors.

Lane's Patent Adjustable Stay Roller.

This article, which is manufactured by Lane Bros., Poughkeepsie, N. Y., the manufacturers also of Lane's steel anti-friction hangers, &c., for whom John H. Graham & Co., 113 Chambers street, New York, are agents, is illustrated in the accompanying cut, which, without detailed description, suffi-



Lane's Patent Adjustable Stay Roller.

ciently indicates its special features. It is made wholly of steel, except the wheel, and may be adjusted, it will be seen, by means of a nut to the thickness of doors, either before or after fastening to the building. The shape is alluded to as insuring great strength. It is also pointed out that it is thoroughly braced, and not liable to derangement under hard usage. This article is made under a recent patent, bearing date October 12, 1886.

How the great bronze Statue of Liberty looks on its pedestal is a question of immediate interest. An observer says: "It was never quite clear before the goddess's head and neck were put in place, just in what direction she would look. Her back is surely now to Communipaw, and her face toward the Narrows and Sandy Hook. It would puzzle a modiste to tell at a glance what sort of drapery the goddess has on. The heavy folds from the waist down look both ancient and modern—a Roman woman's tunic run to length of skirts, perhaps. And if the lower half betrays the tunic, the upper, even more distinctly, is a Roman toga. Its cumbersome folds weigh on the breast and shoulders and gather in a bulging knot under the left arm. The dress is masculine almost, though not more so than the bust and face, the goddess, it must be remembered, having, like the goddess Minerva, the qualities of a man and a woman mixed. The face, as it looks from a distance, is an eager, high-bred one, with pure Greek features which the rich hair gathered in a loose knot above the neck serves only to intensify. There are one or two woodenish curls behind the ears, but most of the rough lines have come out finely. The right arm is held almost perpendicularly, and the hand is turned so that the palm faces outwardly. This would be awkward, the critics say, with a man, but with women and goddesses, of course, such things are beyond solution."

MANUFACTURING.

Iron and Steel.

The United States Iron and Tin Plate Company, at Demmler Station, near Pittsburgh, resumed operations in all departments on the 5th inst., with sufficient orders on hand to keep them busy for six months.

The Braddock Wire Company, of Pittsburgh, which commenced operations some two months ago, inform us that they are compelled to run night and day to keep up with their orders.

The strike which occurred some time ago at the Isabella furnaces, Pittsburgh, has been settled, the men having returned to work at the company's terms.

Daniel J. Sullivan, a well-known scrap-iron dealer of Pittsburgh, died at his residence, Park Place, East End, on the 8th inst. Mr. Sullivan was connected for a number of years with the firm of H. Lloyd, Son & Co., of that city.

The Warren Tube Company have recently been incorporated at Warren, Ohio, with a capital stock of \$200,000, for the purpose of manufacturing compressed iron and steel tubes. They expect to commence operations in January, 1887. The following officers have been elected: N. Monarrat, president; T. M. Cornell, vice-president; J. H. Faxon, Jr., secretary; Wm. A. Palmer, treasurer, and Winslow Alderdice, general manager.

The first wrought iron for natural-gas pipes was bent at the new plant of the American Tube and Iron Company, at Youngstown, Ohio, on Saturday, the 9th inst. On Monday the entire plant commenced operations, over 300 men being

given employment, turning out 8-inch tubes for natural-gas mains. Within a month the concern expects to nearly double its force.

Mabel Furnace No. 1, of Perkins & Co., Limited, at Sharpville, Pa., which has been undergoing extensive repairs, was successfully blown in on the 2d inst. Every furnace at the above place is now in operation.

The Ewald Iron Company, of Louisville, Ky., which control extensive iron works

The new firm are Wm. B. Orr & Co., and are composed of William B. Orr, Charles E. Orr, J. F. Robinson, Curtis Long and James Henry. It is their intention to enlarge the works at once and make a specialty of the Curtis Long high-speed engine. They will, in addition, make patterns, models and all kinds of experimental machinery to order.

The fuel economizer from E. Green & Sons, Manchester and Wakefield, England, recently furnished to the Calumet and Hecla Mining Company, is composed of 52 sections, each containing 10 lengths of 4-inch pipe, 10 feet long, making 5200 feet of 4-inch pipe in the economizer. It is fitted with crab-jaw scrapers which work up and down automatically and keep the pipe on the outside clear of soot and all other dirt. It will be ready for use some time in November, and if it does what is claimed for it the saving on fuel to the Calumet and Hecla will be very considerable.

Two of the Wainwright Mfg. Company's (Boston) feed-water heaters have been in use at the Cumberland and Presumpscott Mills, Cumberland Mills, Me., for the past six months, with very satisfactory results.

The Mason Machine Works, Taunton, have just completed a hitching engine for the Boston and Maine Railroad.

The Baldwin Locomotive Works, Philadelphia, are at present extremely busy and working up to about their full capacity, turning out some 13 locomotives per week, or at the rate of fully 60 per annum.

The Chicago Drop Forge and Foundry Company have been incorporated, with a capital of \$200,000. Incorporators: Charles L. Brooke, Edward R. Swett and Albert J. Norton.

The L. B. Flanders Machine Works, of Philadelphia, have recently shipped the following: Patent portable valve-seat rotary planing machines to the Texas and Pacific Railway, Richmond and Danville Railway, Canadian Pacific Railway, Buffalo, Rochester and Pittsburgh Railway, Baldwin Locomotive Works, O. L. Packard, Milwaukee, Wis. Patent portable crank-pin machines to the Canadian Pacific Railway, New York and New England Railway and Manning, Maxwell & Moore, New York. Patent portable locomotive cylinder boring machines to the North Georgia Improvement Company, Morgan's Louisiana and Texas Railway, Baldwin Locomotive Works and Manning, Maxwell & Moore. Otto's patent flue-cleaning machine to the Pennsylvania Company and Chicago, St. Louis and Pittsburgh Railway. Gipp engine to St. Louis, Arkansas and Texas Railway. Radius link planer attachment to the Tanner & Delaney Engine Company and Manning, Maxwell & Moore. The company find inquiries numerous, and hope for a fine fall and winter's trade.

The Colorado Midland Railway Company intend to build shops at Colorado Springs, Col.

The Sedgwick Machine Works Company will erect new buildings, to cost \$11,000, at Poughkeepsie, N. Y.

Warner & Swasey, Cleveland, Ohio, have let contracts for a new brick addition 70 x 45, three stories, with tower, on account of increasing business. They are very busy on Standard brass-working lathes, Monitor lathes, screw machines and other tools.

The Valley Machine Company, East Hampton, Mass., are furnishing all the machinery, pumps, &c., for a new rubber fabric mill being built in East Hampton by George S. Colton.

The Pratt & Whitney Company, Hartford, Conn., are successfully introducing a metal band saw and a centering machine with two spindles, both of which are proving popular. The demand for small tools is 25 per cent. better than last year.

Hardware.

The new tubular axle works and butt-weld mill being built by the National Tube Works Company, of McKeesport, Pa., will be completed in a few days. A large number of additional hands will be employed when the new works commence operations.

The Star Machine Company, of Buffalo, N. Y., are having a large demand for their forges and blowers from all parts of the country.

The Colby Winger Company, Highlandville, Mass., manufacturers of the Colby wringers, sell no goods to the trade, disposing of the wringers only to their agents, giving them the exclusive control of sales in the territory assigned to them, and binding them to sell only in that territory, and only at full retail prices.

Atwood Brothers' Mfg. Company, Amesbury, Mass., in addition to their line of fine carriage mountings, have recently added the manufacture of carriage lamps, of which they are making several attractive patterns. They advise us that they are busy on orders for these goods, and on sleigh screens and other specialties.

In 1878 the Champion Iron Fence Company, Kenton, Ohio, issued their general catalogue in the form of a small 30-page pamphlet which, compared with their catalogue recently issued, embracing the five special ones, they issue relating to different lines of fence, cresting, architectural and jail work, indicates the progress and growth of the company. In addition to other points of interest the company call attention to the fact that by the introduction of the present style of iron circular stairways the necessity of having first-class mechanics to put up the stairs is in many cases obviated, as it is claimed that any person of fair capacity can put up a flight of these stairs, although he may never have worked in iron a single day. This feature is referred to as an important one, as the company ship fences, stairs and other work to all parts of the country.

The Boston Steel Wire Brush Works, F. W. Sheridan, manager, 82 Sudbury street, Boston, Mass., are making a line of steel wire brushes for cleaning castings, and also manufacture a switch and curve broom for use on street-car tracks.

The Northfield Knife Company, whose hands struck last spring, are reported to have a moderate and gradually increasing force of new men at work.

The Standard Chain Cable Works, of which H. L. Fearing & Co., Boston, are proprietors, are closed at present, the manufacture of chain and coupling links being temporarily discontinued.

Miscellaneous.

The Tacoma Coke Company, whose mines are at Wilkeson, Pierce County, Wash. Ter., after experimenting about two years to manufacture coke out of their coal, have begun the erection of 40 ovens, 10 of which are to be completed at once. This is the only coke manufactured on the Pacific Coast, and is said to be of excellent quality.

The total shipments of coke from the Connellsville region last month were 22,220 cars, as against 25,565 cars during the month of August, though the average daily output for each working day was slightly higher last month, being 1058 cars for September and but 1021 for August. Of the September output the syndicate marketed 16,100 cars and the outside producers 6120, as against 17,690 and 7875 cars respectively for August. Of the 10,930 ovens reported available in the region there were but 566 idle last week, classified as follows: Pool ovens, 100; furnace ovens, 100; independent ovens, 239; old Mt. Braddock Works, idle for several years, 127.

A new glasshouse is to be erected on Carson street, above Brownstown, by the American Glass Company, of Pittsburgh. The company, who were organized recently with a capital stock of \$20,000, will decide on their plans in a few days and commence work at once. They expect to give employment to 100 men, and manufacture bottles and fruit jars.

Lake shipments of iron ore from the mines of the Marquette, Menominee and Gogebic ranges for the past week have amounted to 111,253 gross tons, 24,538 tons of which went from Marquette, 56,294 tons from Escanaba, 2725 tons from St. Ignace and 27,096 tons from Ashland, Wis. The report from Two Harbors, Minn., failed to reach us on time this week. Estimating the shipments from that port at 7000 tons (it will exceed that), and the shipments of Lake Superior ore for the season to date aggregate 2,802,186 gross tons.—Marquette (Mich.) Mining Journal.

The Bellefonte Glass Works, at Bellefonte, Pa., was totally destroyed by fire on the morning of the 10th inst., throwing 75 men out of employment. The loss on real and personal property is estimated at \$50,000, on which there is an insurance of \$20,000 on buildings and stock. The capacity of the works was 1000 boxes per week. The works will probably be rebuilt at once.

The Mississippi Glass Company, of St. Louis, began working on Monday, the 4th inst., from their remodeled 10-pot furnace, with facilities complete in every way for increasing their output by some 6000 feet a day. The furnace is of the latest improved and most efficient gas type, and all other parts of the new plant are admirably arranged for quick and successful work. There are eight annealing ovens and two casting tables. The latter, together with their cylinders, are provided with apparatus for heating with steam or cooling with water, the object being to save time and make the greatest use of the tables possible. With both furnaces in operation the Mississippi Company have a daily capacity of 6000 feet of cathedral glass and 4500 feet of skylights.—Age of Steel.

The St. Louis Metal Company, of St. Louis, a new organization, started a foundry last week for the production of Babbitt metal and solder.

The Pennsylvania Railroad Company have just placed an order for 2000 additional freight cars and the Baltimore and Ohio Railroad Company recently placed an order with the Milton Car Company, of Milton, Pa., for 1000 freight cars.

Under the style of Gilmar, Hartwell & Co., Louisville, Mr. Gilmar and R. M. Hartwell have formed a partnership for the transaction of a general commission business and as special agents for the purchase and sale of pig iron, coke, fire-brick, manufactured iron and steel, nails, wire and general railway supplies, and the sale of old material, such as wheels, rails, scrap iron and brass. Mr. Gilmar has been for several years actively connected with the iron commission business in Louisville, and Mr. Hartwell has been for the past 10 years secretary and treasurer of the Ohio Falls Car Company, of Jeffersonville, Ind.

The canning business has grown to enormous proportions, Maryland and California taking the lead. The total for Maryland comprises 150,000,000 cases per annum, a single establishment in Frederick City putting up of corn alone 25,000,000 cases a year. Other Southern States have only lately gone into the business. Around New Orleans, both in Louisiana and Mississippi, a number of canneries are shipping North and West a large number of the delicacies, oysters, shrimps, preserved oranges and similar products of that region. Relative to the pack of salmon the *Alta California* says: "The total pack in Alaska is estimated at from 125,000 to 130,000 cases, against 75,000 last year and 54,000 in 1884. The pack has been very unsuccessful in every section except Alaska. The shortage of this year will be about 125,000 cases. The principal loss is on the Columbia River, where there is a deficit of fully 100,000 cases. The entire pack will not be over 600,000 cases, or somewhat over one-half that of 1883."

The British Parliament, it is said, will be asked to subsidize the proposed line of steamers for the Canadian Pacific Railway Company to cross the Pacific, and six vessels for the route are approaching completion on the Clyde. Much of the traffic that now goes to the Pacific Mail Line from British ports in the East and Australia and to American transcontinental railways will be competed for by the new line.

Lightning Holes.—Professor Brun has published in the *Archives de Genève* an interesting study on the so-called lightning holes to be found in the High Alps. He and other investigators have found them at heights at from 3348 to 4000 m., or between 11,000 and 13,000 feet, above the sea level. Usually they are found on summits. Sometimes the rocky mass, which has been vitrified in the passage of the electric fluid, presents the appearance of small scattered pearls, sometimes of a series of semi-spherical cavities, only a few millimeters in diameter. Sometimes there are vitrified rays going out from a central point to a distance of 4 inches or 5 inches. Sometimes a block detached from the mass appears as if bored through by a cannon ball, the hollowed passage being quite vitrified. The thickness of this vitrified coating or stratum never exceeds 1 mm., and is sometimes not more than the quarter of that depth. The varying colors which it presents depend on the qualities and composition of the rock. The same may be said as to its transparency. On the Rungfischhorn the glass thus formed by the lightning is black, owing to the quantity of actinolite which the rock contains. It is brown on La Ruinette, the rock consisting of feldspar mixed with gneiss containing chloride of iron. Under the microscope these lightning holes display many interior cavities, which must be attributed to the presence of water in the rock at the moment of melting by the electric discharge. This vitrified material has no influence on polarized light.

Colonel Majendie, C. B., Her Majesty's inspector of explosives, has come to this country, in compliance with instructions from his Government, for the purpose of traveling through the oil regions and studying the laws in different States touching the storage, distribution and regulation of mineral oils and other highly inflammable liquids. He states that before the Explosive act was enacted, 10 years ago, England and Wales had a death-rate of 43 per cent. per year in the manufacture of explosives, whereas during the last eight years of the act the entire death rate in the whole of the factories in England, Scotland, Ireland and Wales included was only 8½ per cent. a year. Last year there was a loss of life of only five out of every 7000 employed in these manufactories.

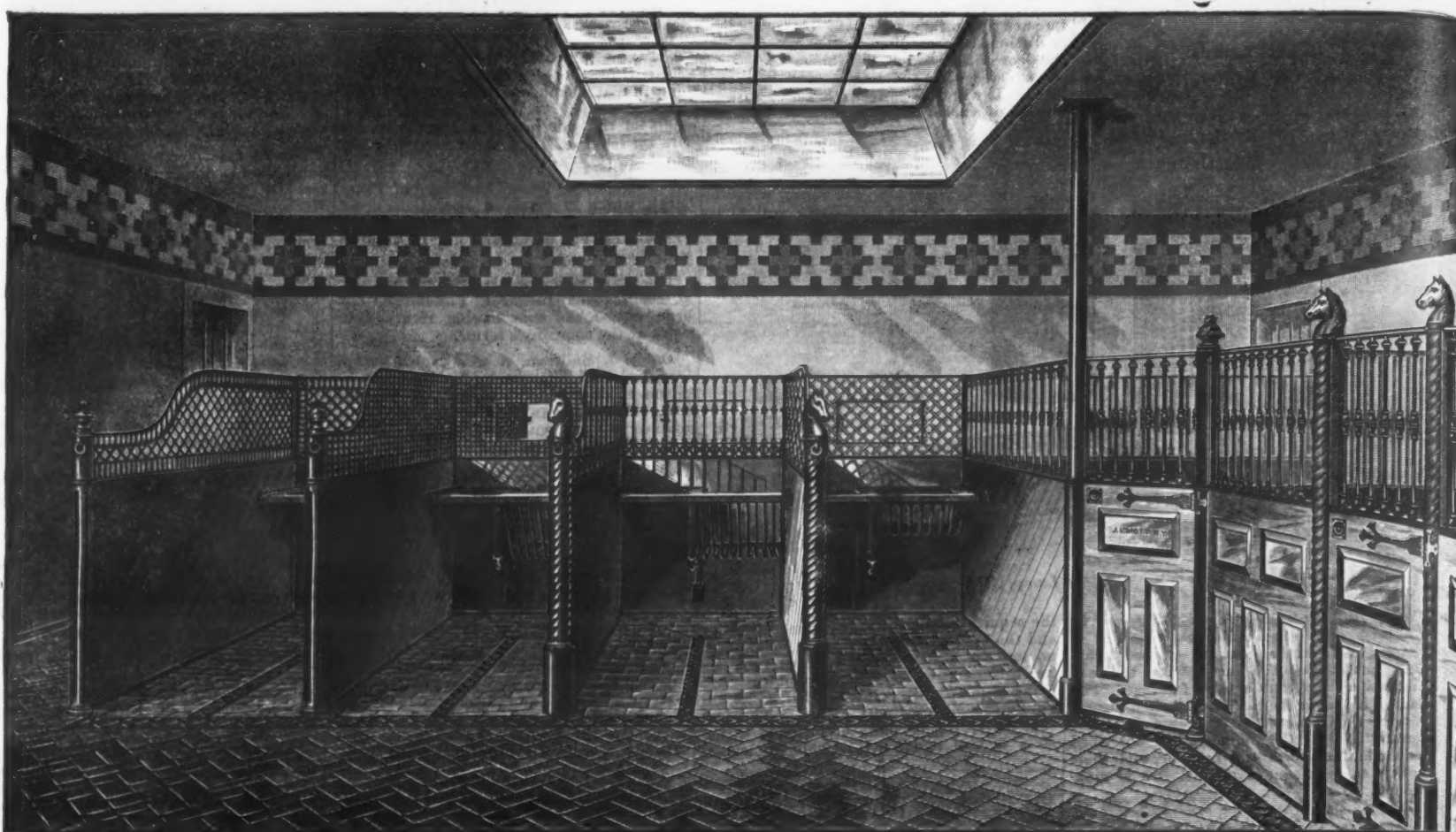
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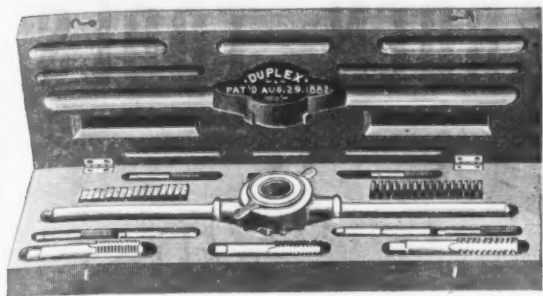
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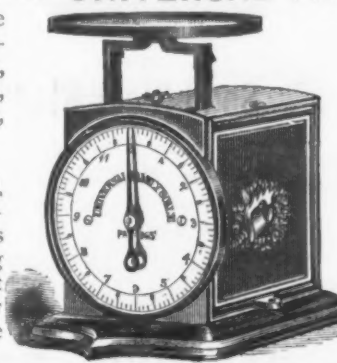
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THE WEEK.

The Aqueduct Commission estimate the necessary expenditure on the work for 1887 at \$5,000,000.

The new Edison machine shops at Schenectady were opened on Monday and will shortly give employment to upward of 1000 men. The plant consists of two brick buildings, one 80 by 200 and the other 100 by 220 feet. A third building, 147 by 50 feet, will be erected.

A member of the firm of H. Diston & Sons, the Philadelphia saw manufacturers, was in Pittsburgh last week examining the manufacturing facilities offered by natural gas, with a view to removing the melting works to that city.

Governor Hill on Saturday commuted the sentence of the Theiss boycotters to 100 days' imprisonment in State prison, which term expired on Tuesday.

The New York Chamber of Commerce contributes for the relief of Charleston \$90,000. The Relief Committee have received 18,000 applications for money to aid in repairing houses, which represent more than 50 per cent. of the total number of houses in the city.

The workmen in the three locomotive establishments at Paterson are to work only nine hours a day hereafter.

Sixteen thousand workmen in the packing-houses at Chicago went on strike against the resumption of 10 hours' time for a day's work. The knit-goods manufacturers at Cohoes and elsewhere have decided to lock out their operatives on the 16th inst., which may render several thousand workpeople of both sexes idle for some months.

The Central Labor Union want the coal men indicted for "limiting the output of coal and arbitrarily fixing its price, in violation of the conspiracy laws of the State."

The iron roof of the ladle repair shop of the North Chicago Rolling Mills, at South Chicago, fell on Sunday morning. Near the repair shop is the steel converter which, when a blast is made, pours out a stream of sparks, nearly all of which alight on the roof of the repair shop. The "spits," as the sparks are termed, are allowed to remain there during the week until Sunday, when the stuff is shoveled off. At the time of the accident five men were on the roof and others were inside, when the entire structure suddenly collapsed. Three men were killed and seven others badly injured. Had the accident occurred on a week day the loss of life would have been appalling, as over 200 men worked in the spot now covered with debris.

The first cargo of petroleum in bulk carried by a steam vessel from the port of Philadelphia will be loaded by the new iron steamship Gluckauf, from Shields, England. She was built at Newcastle-on-Tyne, and has a capacity of over 800,000 gallons.

A. S. Hewitt, the iron manufacturer of this city, represents several strong Democratic factions as candidate for Mayor.

Charles O'Donnell, the well-known nitroglycerine manufacturer, of Findlay, Ohio, was fatally injured while attempting to shoot the water well at the refinery works in that city. While adjusting the weight at the mouth of the casing it slipped, and he was hurled 50 feet in the air, causing fatal injuries.

The financial situation in France, according to the London Standard, makes a dark picture, largely due to wild extravagance in public works, for which object there has been reckless borrowing. The savings bank deposits were first appropriated, and then the funded and the floating debt gradually grew until it stands at somewhere about \$140,000,000—the largest debt of the kind, M. Clarigny says, that any nation ever bore up under. Capital is being withdrawn from the trade of the country to keep the Government afloat, and the occasional fundings of little bits of the floating debt but stave off, if they do stave off, the day of reckoning.

The wages of lake seamen are advanced to \$3 a day by order of the Executive Committee in that department of labor.

The American Tube and Iron Company, at Youngstown, Ohio, on the 9th inst., made the first test in bending wrought iron for tubing at their new plant in the southeastern part of the city. Three hundred men are now engaged in the process of manufacturing wrought-iron tubes for natural-gas wells. The product for the present will be 8-inch pipe, for which there is a large demand. It is expected that with the advent of natural gas a number of additional industrial establishments will be erected.

Mr. Langston, ex-minister to Hayti, heads a movement among the colored men of the South, which has for its object the holding of a national exposition of the products of the race. The scheme will be further developed at the colored men's tenth annual fair in Raleigh, N. C., next month, on which occasion United States Senator Blair, of New Hampshire, will be the chief speaker.

The master builders' association of Boston are obtaining the signatures of all contractors in the building trades, whether located in that or any other Eastern city, to an agreement for mutual support and protection.

One of their propositions is to cut down the hours of work, and to pay by the hour rather than by the day. The principles on which they combine are represented to be the same that control workmen in similar movements.

The Assisted Immigration act of 1886 is declared constitutional by Judge Brown, of Detroit, in a decision rendered 11th inst. The case was that of the United States against John Craig on an action brought to recover a penalty of \$1000 provided for in the act. Mr. Craig imported ship carpenters from the Province of Quebec during the shipyard strike of last spring. Defendants' counsel had interposed the objection that the entire law against importing labor was unconstitutional. The question as presented to the court involved not only the Craig case, but was a test upon which the whole law was to stand or fall. In an elaborate opinion the court overrules all the points raised by the defendant.

Seven artesian wells lately sunk in Newton, Mass., yield 300,000 gallons of pure water daily. The contractors were paid at the rate of \$5.25 per 1000 gallons in the 24 hours.

The steamship Anchoria broke her shaft when five days out from Glasgow, bound for this port with passengers and a heavy cargo. The ship was thrown on her side and the steering gear disabled. In this plight she drifted from September 22 to October 6, when temporary repairs were completed, but subsequent breaks on two occasions rendered the engines useless. Finally a steamer from St. Johns, Newfoundland, took her in tow when 25 miles from that port.

Idaho Territory, its resources and growth, form the topic of Governor Stevenson's annual report to the Secretary of the Interior. Population is rapidly increasing and the crops have been good. Mining interests are prosperous. Fruit products cannot be excelled by any region east of California. As an evidence of growth the fact is stated that 10 years ago there were less than 3000 children of school age in the Territory; now there are 18,000.

On all steamers of any size built at Roach's shipyard, says the Chester Times, the specifications call for a fresh-water tank with a capacity for 10,000 gallons. This was usually carried in three tanks of convenient shapes for stowing and of sizes to admit of their being lowered through the engine hatch, their position being somewhere abreast of the engines. This arrangement has been greatly improved upon by building a tank of the required capacity, firmly securing the same to the engine floors and to the lower deck, one side being formed by the engine inclosure bulkhead itself. Coal is stowed all around the tank in the bunkers, and hence the tank becomes part and parcel of the ship itself. It contains perforated bulkheads and wash plates, so as to break the force that such a quantity of water would have by the rolling of the ship. It is easy of access from the engine-room by a water-tight manhole. The Alliance was the first to have such a tank, and the new Mallory boat is also to have one.

The September product of the Lake Superior copper mines was as follows: Calumet and Hecla, 2785 tons; Quincy, 375 tons; Franklin, 216 tons; Atlantic, 214 tons; Huron, 105 tons.

The tower of the Sheephead Bay Water Supply Company, nearly completed, burst on Thursday and is a complete wreck. It was of boiler iron, 250 feet high, with a diameter of 16 feet through the lower 90 feet and 8 feet above. Water was being pumped into it under a pressure of 85 pounds when it suddenly burst some distance from the ground. E. B. Robinson, of Boston, who built it, was standing near, but escaped without injury. The tower was the idea of Mr. Stephens, the president of the company, who has had long experience in various parts of the world in building water works. It was capable of holding 4,000,000 gallons of water and was to cost \$21,000.

Deep mining on the Comstock lode is partly discontinued in consequence of the refusal of some of the companies to pay their proportion for keeping the ponderous pumps in motion at the combination shaft.

Lighthouses are to be erected on the Vancouver and British Columbia coasts and the naval defenses strengthened.

The work on the Bartholdi statue is nearing completion. Extra rivets are being driven where the plates were fastened temporarily, the right hand remains to be added, and finally the metal diadem and torch. The official programme for the dedication on October 28 includes a grand military and naval review, salutes, speeches at the statue and a banquet in the evening.

Mr. William G. Gibbons, president of the Pusey & Jones Company, boatbuilders and machinists, of Wilmington, Del., died very suddenly on the 6th inst. He was on his way to his office, and when within a block of it was taken sick. He immediately entered a store, and lying down died in less than three minutes. His death is supposed to have been caused by apoplexy or heart disease. Mr. Gibbons was born in Chester County, Pa., and was about 54 years old. He had been living in Wilmington 35 years. In his early manhood he was a member of the firm

of Gibbons & Hilles, iron manufacturers, but during the last 30 years he had been with the Pusey & Jones Company and had been its president since 1879. He figured but little in public life, concentrating his energies mainly upon the advancement of his shipbuilding establishment.

A conference of the leading members of the building trades and the master plumbers' association was held in this city on the 8th inst. with the object of establishing a central organization which can take concerted action when occasion arises in opposition to strikes. President Byrne, of the plumbers' association, occupied the chair, and addressed the meeting, and stated that the time had come to combine against walking delegates, also in defense of the apprentice system, that young men should not be obstructed in learning the trade. There were represented besides the plumbers, master masons, master painters, ironworkers, builders, marble-workers and manufacturing steam-fitters. A committee was selected to ascertain the workings of the Boston and Baltimore associations and to report.

The annual report of the Cincinnati, Indianapolis, St. Louis and Chicago Line, just issued, states: "A contract has just been concluded with the Illinois Central Railroad for an entrance into Chicago and terminals there for 100 years. By this contract the company obtains the right to manage its own affairs in Chicago, naming its own rates and conducting its own business, and paying therefor a percentage of the gross income of the business to and from Chicago over its line, the contract being especially favorable from the fact that if business is dull the payments will be light, and if good the company can afford to meet them."

The boiler at the Bolton Steel Works, at Canton, Ohio, exploded on Thursday last, wrecking the hammer shop. A fragment of the boiler was hurled 400 feet, penetrating the brick wall of the Diebold Safe Works.

A charter has been obtained for an underground railroad in Philadelphia, to extend 15 miles to Chelton Hills; capital stock, \$2,250,000. The president of the corporation is Wm. A. Ingham, president of the Rockhill Iron and Coal Company, and G. G. White, secretary of the Phoenixville Iron Company, is treasurer. Among the directors are Frederick Prime, Jr., president of the Allentown Iron Company, and P. Henszey, of the Baldwin Locomotive Works. The road will be double-tracked. For the right to run under the streets the company proposes in no manner to disturb traffic during the construction of the subway, to renew sewers according to the approved plan of separating house from surface drainage, to carry gas and water pipes and electric-light wires in their subways, to provide a motor which shall be free from smoke, gas and cinders, and to carry passengers morning and evening for 5 cents over the whole subway system. It also engages in no manner to obstruct the streets by stations—of which there will be four to the mile in the business part of the city and three in the dwelling sections—or their approaches. The stations will be placed on property bought along the line, and the approaches will be under the sidewalks.

The United States consul at Rheims, France, reports to the State Department that there is no reciprocity in that district in trade with the United States; that while about \$3,500,000 is paid per annum for the products of that part of France the return traffic is almost nothing. The consul observes: "If reciprocal trade shall be made the motto of American commerce, the commercial world will be soon courting our friendship and favors, and we shall no longer have difficulty in finding open and ready markets for our agricultural, mechanical and commercial products in nearly all countries. It would be well, I think, to apply the reciprocal doctrine to our trade with all nations, and by that means secure a measure of justice for our commercial interests which has already been much too long denied us."

Report says the War Department is trying to secure an experienced man to take charge of the proposed foundry at the Washington Navy-Yard. They expect to pay him about \$2500 a year and to give him the task of running successfully a heavy ordnance foundry with the outfit of a repair shop.

The British War Department has suspended the making of Palliser shot and shells, after a year's trial of the projectiles. Tenders will be invited for the hardest steel.

A coal-tar combination in Philadelphia affords the latest phase of commercial enterprise. This alleged ring proposes to destroy all surplus production in order to maintain the recent advance to \$3.50 and \$4 per barrel, the price paid by the pool contractors to the city, which owns the gas works, being about 80 cents. The commission appointed to destroy the tar, so far as may be found necessary, is W. R. Fowler, of New York. Roofers are much agitated.

An English exchange says that the contract for the construction of the Manchester ship canal has been let to Messrs. Lucas & Aird for the round sum of £5,750,000, £560,000 less than the Parliamentary estimates. These works include cutting of the canal from Manchester to the outlet of East,

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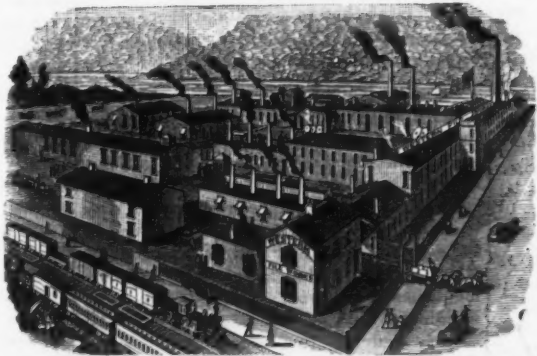
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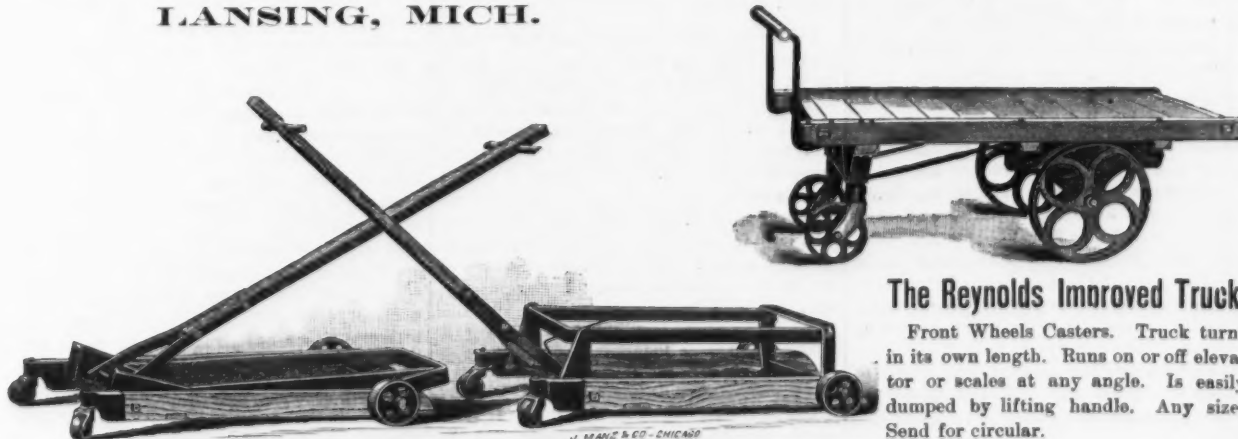
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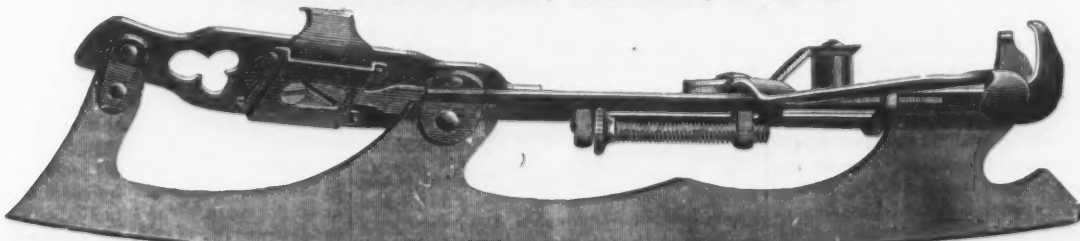
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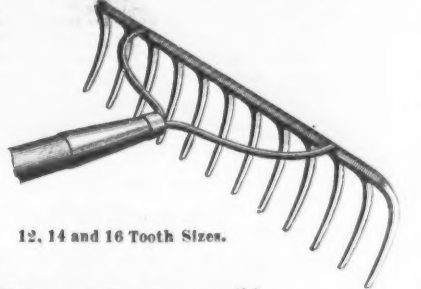
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FINE GARDEN TOOLS.

THE "PEERLESS."

THE "PRIZE."



12, 14 and 16 Tooth Sizes.

The Shank, Head and Teeth are *all forged from one solid bar of Steel*—no iron, no welding, all steel—are not punched out, but drawn under a Hammer, and shaped without Seams or Flaws. Every Rake is *Hardened, Oil Tempered and warranted not to break at Shank.*



THE
'Iowa' Solid Steel Blade Weed Hoe.

In the ordinary pattern of 4 and 6 prong Weeders, the Iron Shank and the Blade are welded on; they easily break off, and the tool cannot be polished well. The "IOWA" has Teeth and Blade of one solid piece, and is given a brilliant polish. These Tools are patented and made exclusively by us.

THE IOWA FARMING TOOL CO.,

Makers of a Complete Line of Steel Goods and Wood Goods.

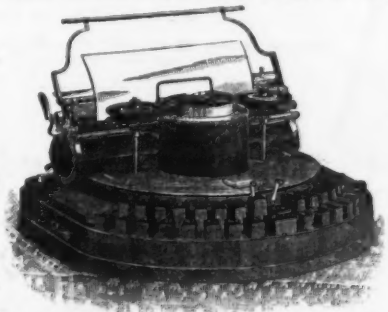
FORT MADISON, - IOWA.

ILLUSTRATED CATALOGUE SENT ON APPLICATION.

The Hammond Type Writer.

The only Type Writer awarded a Gold Medal at the New Orleans Exposition.

SPEED,
Perfect Alignment,
BEAUTY,



STRENGTH,
Changeable Type,
DURABILITY.

CHESAPEAKE AND OHIO RAILWAY COMPANY,
Cincinnati, Ohio, April 15, 1886.

Gentlemen: We have been using a HAMMOND MACHINE for the last six months, and it gives me pleasure to testify to the perfect satisfaction it has given. Its work is not equaled by any other machine, and I am satisfied its wearing qualities far exceed those of any other make.

Yours very truly,

W. P. WALKER, Jr.

THE UNITED BRASS COMPANY,
79 Fulton Street, New York, May 7, 1886.

Gentlemen: We take pleasure in informing you that we have been using your Type Writer for about one year, and up to the present time it has given perfect satisfaction. We think it is the best machine in the market. It can be depended upon in the matter of speed, excellent work and durability. We have had many inquiries regarding the Type Writer, and have in all cases recommended it in the highest terms.

Yours respectfully,

THE UNITED BRASS COMPANY.

For pamphlet and specimen of writing, address

The HAMMOND TYPE WRITER CO.,
143 CENTRE STREET, NEW YORK.

SEYMOUR MANUFACTURING CO.'S Celebrated CRASS SNATHS

WITH ADJUSTABLE FASTENING.

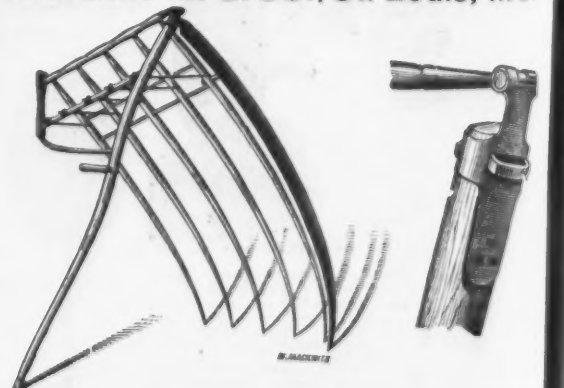
ALSO THEIR PATENT

CREEDMOOR GRAIN CRADLES,
TO WHICH ANY SYTHE MAY BE ATTACHED.

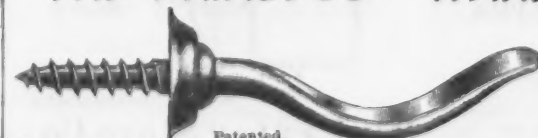
The Best Grain Cradle Ever Manufactured.

Send for Catalogue and Prices.

SEYMOUR MFG. CO., St. Louis, Mo.



"THE PRINCESS" WARDROBE HOOK.



No. 100, Fine Polished Brass, per gross \$16.00.
Discount, 70 and 10 per cent.
Perfection for the purpose and very handsome. No sharp edges, no pointed acorn, no knob to prevent the easy removal of anything hung upon it, no rust to injure garments. Will hold 200 pounds.

THE WIRE GOODS CO., WORCESTER, MASS.

Bright Wire Goods. Tassel Picture and Bangle Hooks, and Specialties in Wire. Wire Nails of all kinds and sizes.

RICHMOND CEDAR WORKS, Limited,
MANUFACTURERS OF
White and Red Cedar and Oak Ware,
RICHMOND, VA.

PATENTED AUG. 24, 1886.



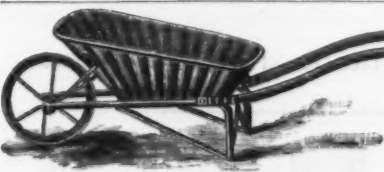
THE above cut represents our new "King" Well-Bucket. This Bucket is made of best Oak Timber, is heavily ironed and nicely finished. This is the strongest and best Well-Bucket ever offered to the trade, and we claim the following advantages:

- 1st. The Bucket is made of tongue and grooved staves, turned smooth inside and out, and is warranted not to leak.
- 2d. The strap runs down side of the Bucket, and is so stamped that it fits over the hoops and laps under the stave at bottom. The ear is securely fastened with staples, and it is impossible for hoops to come off.
- 3d. The Bucket is so shaped that it lies flat on the water, and dips with much more ease than the ordinary bulge Bucket. The bulge is a disadvantage and causes the Bucket to rock on the water like a boat and prevents it from dipping easily. Price List furnished on application.

SMALL CASTINGS.
WARRANTED SOFT, CLEAN, SMOOTH.
LOW PRICES



OR
LARGE CONTRACTS.
Springfield Foundry Co. Springfield, Mass.



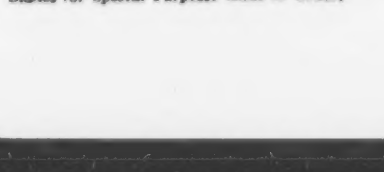
THE STRONGEST AND BEST WHEELBARROWS.
DREYFUS
Corrugated Steel Wheelbarrows.
I. C. DREYFUS & CO.,
29 Rose Street, New York.



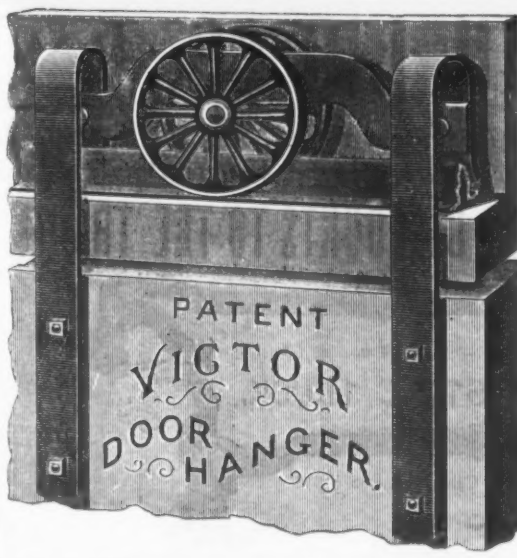
THE PERFECT
Towel Holder
This little article is unexcelled for hanging Kitchen, Shop, Bar Room and other Towels, for suspending temporary curtains and numerous other purposes. They have met with unparalleled success for the short time they have been on the market, and are liked by all who see them. Sample dozen, \$1.00, net; gross, \$7.00, net. Special prices given on large quantities.
HAFF & CO., Box 24,
HARTFORD, CONN.
Pat. Dec. 1, 1885.



Palmer's Common Sense
FRAME PULLEY.
Saves the User 50 Cts. Per Doz.
Mortising all done with a bit. No chisels or other tools required. By hand—eight to one. By power—twelve to one. The only Frame Pulley the Trade can handle with profit. The only Pulley users will buy after seeing this.
MANUFACTURED BY
Palmer Mfg. Co., Troy, N.Y.
Sole Eastern Agents,
PEABODY & PARKS, Troy, N.Y.



THE HATCH BROTHERS CO.,
BRIDGEPORT, CONN.,
Patented Novelties,
FINE POCKET CUTLERY, SPECIAL TOOLS OR
MACHINERY, LIGHT HARDWARE, &c.
Blades for Special Purposes Made to Order.



Wrought Iron.
Anti-Friction.

IT EXCELS ALL OTHERS
IN
Security of Door.
Strength of Material.
Ease of Motion.
Simplicity of Application.
THIS HANGER
Requires no Oil.
Has no Flanged Wheels.
Packs snugly for Shipment.
SELLS BEST.

VICTOR
MFG. CO.,
Newburyport, Mass.

JOHN T. LEWIS & BROS.,
SUCCESSORS TO MORDECAI LEWIS.
Established 1771.



Pure White Lead in Oil, the most reliable for Whiteness, Fineness, Body, and Covering Capacity.
RED LEAD, Litharge and Orange Mineral.
PAINTERS' COLORS of a Very Superior Quality.
LINSEED OIL, Raw, Boiled and Refined.

JOHN JEWETT & SONS,
MANUFACTURERS OF THE WHITE LEAD. WELL-KNOWN BRAND OF



TRADE MARK.
ALSO MANUFACTURERS OF
LINSEED OIL.
181 Front Street, New York.



ATLANTIC WHITE LEAD
and LINSEED OIL CO.,
MANUFACTURERS OF
ATLANTIC PURE WHITE LEAD, unequalled for Uniform Whiteness, Fineness and Body. The most reliable White Lead made. RED LEAD and LITHARGE.

Raw, Refined LINSEED OIL and Boiled
287 Pearl St., New York.

Grindstones, Emery, &c.
THE CLEVELAND STONE CO.,
Manufacturers of
GRINDSTONES,
MOUNTED STONES,
SYTHE STONES, &c.,
BUILDING STONE and
SAWED FLAGGING.

OFFICE
71 & 72 Wilshire Building CLEVELAND, OHIO.

Walter R. Wood,
GRINDSTONES,
Berea, O., Nova Scotia & other brands.

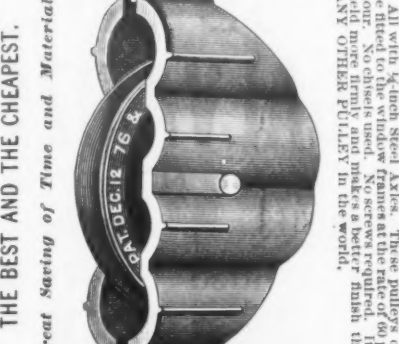
283 and 285 Front St., New York.

GEO. CHASE.

Genuine Green Paper Brand Wash
It is Stone in the Best

OIL STONE.
107th St., Harlem River, N. Y.

The Empire Sash Pulley.
FOUND AT LAST!



THE BEST AND THE CHEAPEST.
Great Saving of Time and Material.
MANUFACTURED BY
EMPIRE PORTABLE FORGE CO.,
COHOES, N. Y.,
Manufacturers of the largest and best line of
Portable Forges and Hand Blowers
FOR SALE EVERYWHERE.

What is Said of
"MORTON'S SASH CHAINS."

NEW YORK, July 20th, 1886.
THOMAS MORTON, Esq.
Dear Sir: I have much pleasure in informing you that the Cable Chains used throughout my house, built twelve years ago, have not in a single instance given any trouble, and see no reason why they should not last a lifetime. Yours respectfully,
F. C. BARNUM, 108 Chatham Square, New York.
MR. THOMAS MORTON.
Dear Sir: We take pleasure in testifying to the excellence of your patent Champion and Cable Sash Chains. The best endorsement we can offer is that in no instance coming under our observation, where it was properly hung, has it failed to give entire satisfaction. We can cheerfully recommend your Sash Chains to all parties that contemplate building, and can say our sales have increased a hundred-fold in the last six months. It is becoming very popular, has worked a revolution, and will in time supersede all sash cords.
Respectfully yours,
HOPKINS & STEINER,
180 Federal Street, Allegheny, Pa.
MANUFACTURED BY
THOMAS MORTON,
65 ELIZABETH ST., NEW YORK.



THE
"Challenge" Fire Hose Carriage
Holds from 500 to 800 feet of 2 1/2-inch Hose; 44-inch Wheels; Patent Swing Tool Box; no weight on handles; nickel-plated trimmings; light and easily handled. Price, including 300 feet best quality 2 1/2-inch Linen Hose, coupled, \$100.
EDWARD H. JACOBS & CO., Mfrs., Danielsonville Conn.

MOULTON'S
Improved Lemon Drill.
Patented June 28th, 1886.
Will extract the LAST DROP OF
juice from large and small lemons
in five seconds.
Sent by mail on receipt of 15 cents; \$1 per doz. 10% discount from this next 30 days, cash with order. Agents wanted. Ask your jobbers for them. Address patentee and sole manufacturer.
W. F. MOULTON, Burlington, Vt.

BUFFALO SCALES
STANDARD SCALES
AWARDED FIRST PREMIUM
AT THE WORLD'S EXPOSITION, New Orleans.
(Four Gold Medals). All other principal makers competitors. See Sent, Scales, Platform Scales, etc. Important patented IMPROVEMENTS. BEST VALUE FOR YOUR MONEY. For circulars, terms and prices, apply to
BUFFALO SCALE COMPANY, BUFFALO, N. Y.

METAL AND RUBBER STAMPS,
steel figures and letters,
name stamps, type for cash
writers, chased-iron figures
and letters, stamps for ruling
letters on wood or
metal, branding irons, pat-
tern letters, stencils, house numbers, metal-bod-
ied rubber type, rubber stamps, &c. Send for free illus-
trated catalogue.
BELL & DICKEY, 39 to 43 Viaduct St., Cleveland, O.

JEFFERSON IRON WORKS,
Steubenville, Ohio,
MANUFACTURERS OF

JEFFERSON STEEL NAILS,
WITH NATURAL GAS FUEL.

ham, the building of docks at Manchester and Warrington, the construction of the necessary locks and the swing aqueduct at Barton and the whole of the railway deviations.

It is reported that the Governor-General of Cuba has been notified from Madrid that duties are to be collected according to the third column of ruling tariffs only on such goods as are natural products of the United States proceeding from any of their ports and imported under the American flag, and by no means on foreign goods, which shall pay according to the fourth column as heretofore, even when imported by American vessels proceeding directly from the United States.

The Lake Superior Dry Dock Company have been incorporated at Chicago, with a capital of \$250,000. John Fitzgerald, of Milwaukee, is president. The dock will be 200 feet in length, 70 feet wide and 16 feet over the miter sills. Montreal is agitating in favor of a dry dock of the largest capacity for ocean steamers.

The Government officers who spent the last two years in Hudson's Bay and Straits taking observations report that navigation is practical for four to four and a half months of the year. This report bears upon the probability of completing the railway from Winnipeg to Hudson's Bay, which is expected to open up a short outlet to Europe for both the American and Canadian North-west. Canadian journals represent that a railroad to Hudson's Bay is an assured fact, that rails for 40 miles have already arrived, and that a syndicate under Hugh Sutherland are amply provided with capital to attain the object.

Discoveries of large deposits of plumbago, or black lead, are reported in the Verdugo hills, Nevada.

Transatlantic freights at this port show some improvement of late, and a very good inquiry is noticed for tonnage to load cotton at Southern ports. Rates for grain have stiffened, but in grain charters Baltimore and Newport News are taking the bulk of the business.

The Illinois State assessment of railroad property this year is \$62,972,101, against \$60,987,317 last year. The increase in mileage is given as 177.

French and German manufacturers alike are forming syndicates to promote the export of the products of industry, to this end dispatching "inspectors" to such markets as afford the best prospects, who are followed up by representatives prepared with catalogues and otherwise qualified to give information, as well as to gather facts calculated to advance the general object.

The report of the commerce of Baltimore for the year ending June 30, 1886, shows a shrinkage both in exports and imports. The total value of exports was \$35,835,311, as against \$45,041,634 in the year ending June 30, 1885. The total value of imports was \$11,736,419, against \$11,753,317 in the year ending June 30, 1885. The largest decrease in exports shown was in wheat, which was valued at only \$3,426,262, against \$12,009,027 in the previous year. In imports the largest decrease is in coffee, while nearly all kinds of metals show a general increase.

Australian commercial bodies seek to influence the United States in favor of a reduction of the import duties on wool by tariff revision.

Chains and pontoons have been unavailing in the effort to remove the stranded steamer Saratoga, of the Troy Line, from the flats near Tivoli.

T. Rowland's Sons shovel works at Cheltenham, Montgomery County, Pa., were destroyed by fire 6th inst. Loss \$20,000.

Three iron ferry-boats are being built at Newburg for the New York and South Brooklyn Steam Ferry and Transportation Company. The ferry will be in operation before January 1.

The Independent Petroleum Refiners' Bureau has been organized, with headquarters in Cleveland, and an executive committee, of which F. D. Cummer is chairman. The capacity of the stocks of the united concerns is 50,000 barrels.

A coal ring in Milwaukee is charged with conspiracy, and Judge Mallory has the subject under advisement.

A contemporary remarks that with half a dozen factions in New York City contending for the control of \$35,000,000 annually in the management of local affairs the apathy of the great body of taxpayers is amazing.

New South Wales has a deficit of \$10,000,000 in the revenues of the last fiscal year.

A factory in Bayard street, formerly occupied by David Block, manufacturer of tinware, caught fire on Thursday morning from the explosion of an oil stove, and the retreat of the workmen being cut off, except by the roof, a shocking catastrophe was barely averted. One woman rolled to the cornice, clung for a moment, and fell to the pavement, fatally injured. There was but one mode of exit from the building, a second stairway having been boarded up.

The Mechanics' Fair just closed in San Francisco was a decided success, yielding a

goodly margin on the side of profit. The building, which was erected in 1880, cost nearly \$300,000, of which only a small portion now remains unpaid. Goss & Dow's pumping machinery was especially worthy of notice. Baker & Hamilton, manufacturers and importers of hardware and farm machinery, had a large display. Geo. H. Tay & Co. took the honors among stove manufacturers, and in plumbers' brass goods and steam work Charles E. Parcell received the gold medal.

The imports at San Francisco for August amounted to \$3,252,637, which is almost \$1,000,000 ahead of last year. The increase from the Hawaiian Islands was over 50 per cent. Japan more than doubled its record for August, 1885, and Australia nearly doubled it for the same month.

The new American steamer Alliance, of the United States and Brazil Mail Line, started out for her destination with probably the largest assorted cargo ever shipped from our Atlantic ports to South America. Of agricultural implements she had 400 cases; hardware, 480 cases; machinery, about 100 cases and packages, also nails, tacks, cutlery and manufactured iron in liberal proportions. Several large lots were consigned to merchants in Buenos Ayres. Traders of all classes recognize the importance of maintaining regular steam communication with the ports of Brazil and the Argentine Republic under a mail contract.

Alleged fraudulent warehouse receipts given by the managing partner of the packing-house of J. C. Ferguson & Co., of Chicago, drove the firm into suspension, and banks in Chicago and New York suffer to the extent of \$300,000. A Chicago dispatch says the blow is a very serious one to the Board of Trade, because it impugns to a certain extent the value of warehouse receipts, which have long been considered the best of paper upon which to make loans.

A letter from Amsterdam describing the great palace in that city which the King occupies six months in the year says many of the rooms are heated with nickel-plated American base-burner coal stoves. These stoves are the size and shape found in many an American home. They are labeled Crown Jewel, and they look strangely out of place amid their Dutch surroundings. Sending American stoves to Holland is only requiring past favors. In Richmond, Va., may be seen the original Holland stove which heated the old House of Burgesses long ago.

The Chicago Tribune directs attention to the fact that for two weeks or more there has been an almost continuous decrease in the prices of provisions and cereals, until now breadstuffs are at the lowest point in valuation known for a long time past, hardly equal to the cost of production, and this although the cost of farm products has been much lessened by the introduction of farm machinery.

The proposed removal of the Indian warehouse from New York to some Western city will be considered at a meeting of parties interested on some day to be fixed by the Indian Commissioner.

A proposition to enlarge the State canals by employing convict labor on work is spoken of as "new, ingenious and worth considering," but will hardly influence the views of railroad companies.

The need of important modifications in the laws of Mexico calculated to afford security to citizens of the United States who go there was the subject of remark by Secretary Bayard while in Saratoga. American capital tends strongly in that direction, and reacts favorably upon the United States through the various channels of business. Mr. Bayard is reported as saying: "All that we ask is that American citizens and American enterprise and American industries may be protected, and that they may know that they are secure in the possession of any property they may acquire. This question of protection is of the most vital importance, and until Mexico changes its laws and guarantees protection the better class of Americans will stay away from the country."

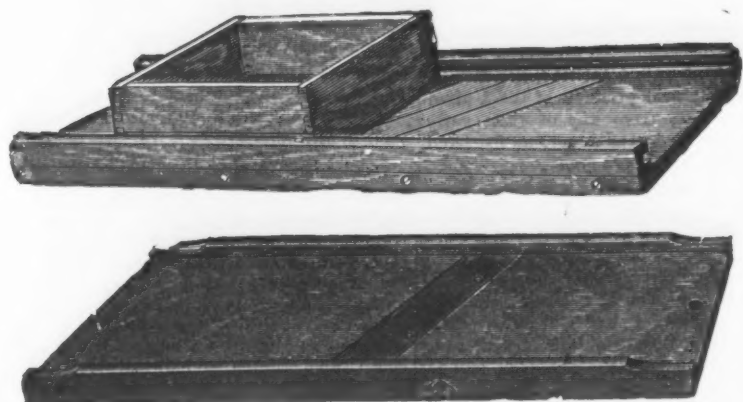
Automatic machinery for reeling silk is being prepared in Washington City, under the direction of the Commissioner of Agriculture, and, if successful, there is reason to believe that silk culture can be established in this country with profit. The United States last year imported raw silk, duty free, to the value of nearly \$20,000,000. If the cocoons which entered into this silk had been produced in this country it would have added \$15,000,000 to the income of our farming class, and it would have required nearly 12,000 persons to operate the machinery necessary to convert them into raw silk.

Of 149,000 tons of dead freight shipped eastward from Chicago in September the three Vanderbilt lines carried nearly 56 per cent., and the Michigan Central 27 1/2 per cent. A Chicago telegram says: "The wide difference between the actual and allotted percentages of some of the roads is due to the fact that the roads running short during previous months cut the rates during September in order to catch up and avoid the evening up of balances in cash. This practice of evening up balances by cutting rates has been steadily growing, and unless speedily stopped is likely to cause some serious complications."

THE TUCKER & DORSEY MANUFACTURING CO., INDIANAPOLIS, INDIANA.

Manufacturers of Alarm Tills, Stove Trucks, Saw Bucks, Kraut, Slaw and Vegetable Cutters, Towel Racks and Rollers, Tinner's Mallets, Hats and Coat Racks, &c., &c.

WRITE FOR PRICES AND DISCOUNTS TO THE TRADE.



ASK YOUR JOBBER FOR

ALAN WOOD COMPANY'S PATENT LEVEL GALVANIZED SHEET IRON

AND HAVE NO OTHER.

Absolutely FLAT and FREE FROM ALL BUCKLES.

Silver Medal awarded by Franklin Institute 1885.

Every Bundle branded "PATENT LEVEL."

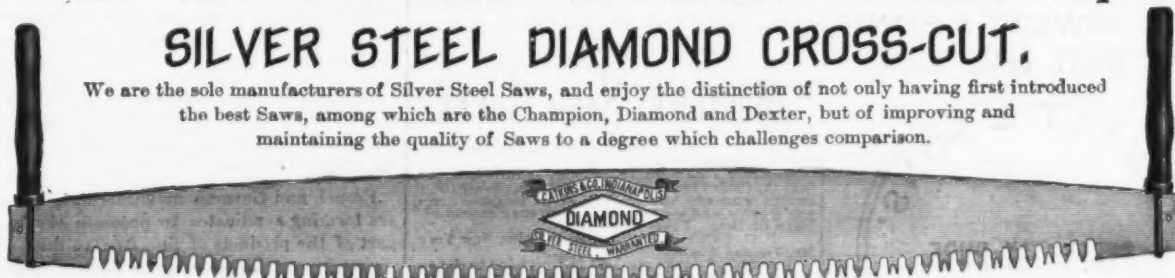
ALAN WOOD COMPANY, PHILADELPHIA.



E. C. Atkins & Co., Indianapolis, Indiana.

SILVER STEEL DIAMOND CROSS-CUT.

We are the sole manufacturers of Silver Steel Saws, and enjoy the distinction of not only having first introduced the best Saws, among which are the Champion, Diamond and Dexter, but of improving and maintaining the quality of Saws to a degree which challenges comparison.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

ATKINS'

Cross-Cut, Circular, Band and Gang

SAWS

Are Everywhere Recognized as the Standard of Excellence.

THE SALEM WIRE NAIL CO.,

SALEM, OHIO,

—MANUFACTURERS OF—

WIRE and WIRE NAILS.



AGENTS:

ELY & WILLIAMS,
New York
and
Philadelphia, Pa.

F. K. BOWES,
Chicago, Ill.
JNO. H. HEIMBUCHER,
St. Louis, Mo.

N. U. WALKER CLAY MFG. CO.,
Pittsburgh, Pa.

PERRINE PATENT

Curved Blade **HOE** Double Shank

Manufactured only by the



CANTON HOE & TOOL CO.,

CANTON, OHIO, U. S. A.



WIRE STAPLES

IN EVERY VARIETY.
CHISEL AND LANCET (or Boardman) POINT.
BLIND STAPLES A SPECIALTY.

Send for Sample and Prices.

HOAG & TITCHENER Binghamton, N. Y.

AMERICAN BOLT COMPANY,

BOLTS AND NUTS, COACH OR LAG SCREWS

Bridge Bolts, Car Bolts, Track Bolts, Washers, Chain Links, BUILDING BOLTS
AND IRONS OF ALL KINDS, Forgings, Bolt and Nut Machinery, &c.

JAMES MINTER, President

LOWELL, MASS.

MILES F. BRENNAN, Treasurer.

CRONK HANGER CO.,

— ELMIRA, N. Y. —



MANUFACTURERS OF THE

CRONK'S PATENT

Wire Cutter, Bender and Plier and
Hog Ringer Combined.

Specially Adapted for Use on Wire Fences; also Best in the World
for TINNERS' Use. Patent Allowed.



SOMETHING NEW!
The Diamond Lock Faucet,

PATENTED APRIL 10, 1883.

John Sommer's Son, Manufacturer of John Sommer's Wooden Faucets,
Mallets and Variety Wood Turning,
8, 10 and 12 Pearl St. Newark, N. J.

1st. A Lock Faucet that cannot be picked, will not leak, and keeps tight.
2d. A Faucet that can be driven and will not split, as it has a solid head, the working parts being on the top.
3d. Made from selected hard rock maple polished, all metal parts used in its construction being pure black tin, which, as commonly known, will not corrode or affect any kind of liquid.

Knoxville Car Wheel Co.

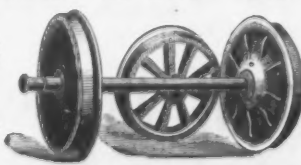
Manufacturers of

CHILLED WHEELS

OF ALL KINDS,

With or Without Axles.

KNOXVILLE, TENN.



THE CELEBRATED

Carter County

Cold Blast
Charcoal Iron

IS USED EXCLUSIVELY BY
THIS COMPANY.

EXPANDING
TAPS



From 3-4 in. to 10
in. Wrought-Iron
Pipe Size.

SEND FOR PRICES.

WORSWICK MFG. CO.,
CLEVELAND, O.,

Manufacturers of

Malleable and Cast Iron Fittings and
Brass Goods.

Jobbers of

Plumbers', Gas and Steam Fitters'
Tools and Supplies.

Agents for

IRON PIPE AND BOILER TUBES.

SEND FOR CATALOGUE.

GUN POWDER.

LAFLIN & RAND POWDER CO.,

No. 29 Murray Street, New York,

Manufacture and sell the following celebrated brands
of Sporting powder, known everywhere as

Orange Lightning, Orange Ducking
Orange Rifle.

More popular than any Powder now in use.

BLASTING POWDER and ELECTRICAL BLASTING
APPARATUS. MILITARY POWDER on
hand and made to order.

Safety Fuse, Frictional and Platinum Fuses.
Pamphlets showing sizes of grain sent free.



Established 1830.

THE PLYMOUTH MILLS.

Rivets, Trunk Nails
Tacks, Clout Nails,
Burs, Wire Nails.
PLYMOUTH, MASS.



With these devices, Transoms may be opened and closed at will with ease and locked in position, no other fastenings are required, any one can put them on. CAUTION, look for the Trade Mark on the handles.

We are now prepared to fill orders for the "Crown" and "Star" Lifters, in such sizes as are listed below, which are suitable for house and office transoms, and hope soon to announce our ability to supply sizes for store transoms.

Price List "Crown" Lifters.				LIST.		Price List "Star" Lifters.			
No.	Length	Size of Rod.	Price Each.	APRIL 8th	No.	Length	Size of Rod.	Price Each.	
43	3 feet	3/4 x 5/16	Bronzed Iron. \$0.55	1886.	83	3 feet	3/4 x 5/16	Bronzed Iron. \$0.70	
44	4 "	" "	" " 0.65		84	4 "	" "	" " 0.80	
45	5 "	" "	" " 0.75		85	5 "	" "	" " 0.90	
43 1/2	3 1/2 "	Nickel Plated.	1.75		83 1/2	3 1/2 "	" "	Nickel Plated. 2.00	
44 1/2	4 1/2 "	" "	2.00		84 1/2	4 1/2 "	" "	" " 2.25	
45 1/2	5 1/2 "	" "	2.25		85 1/2	5 1/2 "	" "	2.50	

FOR COMPARE BY NUMBER

FOR SALE BY J. E. HOLLENBECK, Chicago, Ill.

ORDER BY NUMBER.

For Sale by J. F. WOLLENSEK, Chicago, Ill.

"BUFFALO" DAMPER AND CLIP.



Damper. JAPANESE AND NICKEL PLATED HANDLE.

Clip.

Place Damper in pipe so that the plate-shank A projects from hole. Fit the handle B on plate-shank. Insert in the handle the screw C, and screw it into hole in plate-shank.

Single Bearing.
3 Pieces Only.
No Springs.

This Damper requires but ONE HOLE IN PIPE, and is, we think, the SIMPLEST MOST CONVENIENT, DURABLE AND HANDSOME ONE in the market.

Please send for prices. Address the Sole Manufacturers,

SIDNEY SHEPARD & CO., - BUFFALO, N. Y.,
C. SIDNEY SHEPARD & CO., - CHICAGO, ILL.

The Star Scissors and Shears,

MANUFACTURED BY

W. SCHOLLHORN & CO.,

New Haven,

Conn.



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Prospect of a New Coking Coal in Tennessee.

Some time since I noticed in the columns of *The Iron Age* a great purchase of stock in a coal-land company in East Tennessee; still later a purchase has been made by the same parties of stock in various companies, so that to them is given the ownership and control of a large area of the best and richest coal lands in the South. In my former article it was stated that Gen. Samuel Thomas, president of the East Tennessee, Virginia and Georgia Railroad, and associates, had purchased the one-half interest of Chas. A. Bulky in the Coal Creek Mining and Mfg. Company, leaving one-fourth in the hands of the Wiley estate and one-fourth in possession of various parties. The Coal Creek Mining and Mfg. Company also owned a control in the Walden's Ridge Railroad and the Oakdale Coal and Transportation Company. The Wiley estate, in addition to their owning one fourth in the Coal Creek Mining and Mfg. Company, also owned a control of the Poplar Creek Coal and Iron Company, an equal interest in the Harkins part of coal land (7500 acres), and a three-fourths interest in the Wheeler Iron and Coal Company. Lately the Coal Creek Mining and Mfg. Company, or rather General Thomas and associates, have through Mr. E. R. Chapman, of New York City, purchased the entire interests of the Wiley estate, thus obtaining more than a control of about 95,000 acres of coal land. This great area of coal land is in the heart of the Upper Measure Field, and in the major part of its area has seams of coal over 3 feet thick. In fact, it places in the hands of this great syndicate all of the Upper Measure Field but about 25,000 acres. The question naturally arises, Is this good or bad to the interests and development of the East Tennessee coal field?

A very large part of this area has been owned by parties who did not have the boldness, if they had the means, to make such improvements as would develop their property to an extent commensurate with the demands of the times, nor to conduct such experiments as would show the value of their varied seams of coal and increase its uses and consumption. Notably was this the case as to the matter of coke. With 3000 feet of coal measures above the waters of Coal Creek, from the time of the commencement of mining in 1868 to a few months past the owners of this property have only worked one seam of coal, and it nearly the lowest, and have barely proven the existence of the others by the scantiest test drifts. And with all these mine seams of workable coal the owners have not demonstrated whether or not there is in that vast mass of measures any coal which will make a first-class coke. The new owners propose to and will test this thoroughly. The new president of the company is E. J. Sanford, one of the most successful and energetic business men of Knoxville, Tenn., and also one of the directors of the East Tennessee, Virginia and Georgia Railroad. It is his plan to have new seams opened, and 20 cars each of such coals as look favorably sent to Richmond to be made into coke under the supervision of the very careful and intelligent superintendent of the Roane Iron Company's works at that place. It is plain that at least some new ideas of those coals will be ascertained, and if a coke is obtained which will carry a large burden in tall stacks a new era will be marked in the progress and history of Southern iron-making, and long-talked of, but not realized, industries spring up around Cove Creek and Knoxville. The owners of the Cranberry Mines only wait the possibility of obtaining a first-class coke to erect one or more stacks at Johnson City, and the counties of Monroe, Blount, Cocke, Greene and Washington all contain enormous deposits of limonites, accessible and easily to be drawn to Knoxville by branch roads already built or easily to be constructed.

What are the possibilities of ever a coke being made? It is a simple fact that no one can tell what it is possible to obtain from the seams of coal above seam H—that marked at Coal Creek—for the character of the coals is unknown. Though annually getting a royalty which from \$10,000 per year in 1870 has steadily risen to \$50,000, and so been for some time past, the late owners of the property have never had made either a scientific or practical survey and examination of their coal seams; hence, with an unknown field for exploration, it is both possible and probable that the best results may be obtained from the experiments to be tried. One thing is certain—that no care, time nor expense will be spared to make the tests thorough and perfect. It is hardly possible to estimate the valuable results which will accrue from the discovery of a first-class furnace field in this region. It is now reached by two railroads—one, the Walden's Ridge Railroad, connects with the Cincinnati Southern at Emory Gap, and goes thence on to the Poplar Creek coal field. It will be extended to Clinton on the Knoxville and Ohio Railroad. The other road is the Knoxville and Ohio, owned and operated by the same owners as the E. T. V. and G. R. R. It taps the Upper Measure Field at Coal Creek, and has branches running far up in the measures; also taps it at Careyville, and runs along its border for 8 miles. Hence, if good coking coal is obtained the facilities for transporting it on the one system of roads to other parts of East Tennessee, to Georgia and Alabama are of the best character. It is to be hoped that these experiments will furnish the much-needed wants of the iron-manufacturing interests of the South.

H. E. C.

Nitro glycerine and dynamite do not, when exploded, exert such a force as is popularly believed. To speak precisely, the power developed by the explosion of a ton of dynamite is equal to 45,675 foot-tons. One ton of nitro-glycerine similarly exploded will exert a power of 64,452 foot-tons; and 1 ton of blasting gelatine similarly exploded, 71,050 foot-tons. These figures, although large, are not enormous, and need not excite terror. Seventy-one thousand tons of ordinary building stone, if arranged in the form of a cube, would measure only 90 feet on the

side, and, if it were possible to concentrate the whole force of a ton of blasting gelatine at the moment of explosion on such a mass, the only effect would be to lift it to the height of a foot. These figures are said to have been derived from careful experiments.

Foreign Merchandise Imported in Interior Points Direct.

The following statements, prepared by the Special Agents' Division of the Treasury Department give the first detailed and accurate comparative figures as to the operations of the Immediate Transportation act for the last fiscal year. The first statement shows the quantity, value and estimated duties thereon of unappraised merchandise transported from ports of first arrival to ports of destination:

Year.	Pkgs.	Invoice val.	Est. duties.
1879.....	219,511	\$8,745,693	\$4,244,880
1880.....	329,886	13,125,758	6,189,710
1881.....	353,901	14,519,474	6,604,447
1882.....	539,188	21,440,540	10,186,940
1883.....	1,120,619	36,283,922	12,225,630
1884.....	1,423,302	37,806,507	12,323,879
1885.....	1,122,528	25,860,803	11,754,109
1886.....	1,374,224	29,255,104	14,403,996

The merchandise above referred to was forwarded from the following ports of first arrival:

Port of importation.	Pkgs.	Invoice value.
New York.....	375,696	\$18,541,171
Boston.....	54,462	469,506
Baltimore.....	18,264	477,214
Chicago.....	19	512
Detroit.....	3,708	32,296
New Orleans.....	342,204	2,148,043
Philadelphia.....	117,085	3,070,738
Port Huron.....	44,734	243,023
Portland.....	196,814	957,548
San Francisco.....	223,238	3,295,058

The merchandise above referred to, shipped from these 10 ports of first arrival, was distributed among the following 36 ports of destination:

Port of destination.	Invoice value.
Chicago.....	\$9,133,609
Philadelphia.....	3,423,304
San Francisco.....	2,838,342
St. Louis.....	2,583,473
Cincinnati.....	1,932,010
Boston.....	1,728,826
New York.....	1,649,966

Quantities aggregating less than \$1,000,000 went to Atlanta, Baltimore, Buffalo, Bath, Cleveland, Denver, Detroit, Georgetown, D. C., Galveston, Hartford, Indianapolis, Kansas City, Louisville, Memphis, Milwaukee, New Haven, New Orleans, Pittsburgh, Portland, Me., Portland, Ore., Providence, Port Huron, Richmond, Rochester, Savannah, St. Joseph, St. Paul, Toledo and Wilmington, Del. The increase was most extensive in reimported American whiskey, but was also large in silks and dry goods of various kinds, tin plate and numerous other articles.

The Bells of St. Michael's, Charleston, S. C.

The church of St. Michael's, says the *Washington Post*, was looked upon with veneration by the inhabitants of South Carolina as a memento of old colonial days. It was built at the commencement of the eighteenth century after the designs of a London architect, a pupil of Sir Christopher Wren, of St. Paul's Cathedral fame. Sir Christopher himself suggested many of the features, and the design bears a general resemblance to that of St. Martin-in-the-Fields, facing Trafalgar square, in London. The spire was noted as being one of the finest specimens of architecture in America. The bells of St. Michael's have a curious history. They were originally manufactured in England, and were a gift to the colony. When the British, during the Revolutionary War, captured the city they took the bells, and on their evacuation they packed them up and sent them to England. After the treaty of peace had been consummated negotiations were opened in London for the return of the bells by the first American minister to Great Britain. He succeeded, and the bells were sent to Charleston, and upon their arrival were received with triumphant ovations and escorted by a large procession to the church, in the belfry of which they were replaced. During the late civil war the citizens of Charleston were desirous of protecting the bells from danger, and, as the steeple of St. Michael's was made the target for the cannon of the besiegers, the bells were taken down and sent to Columbia for safe-keeping. When Sheridan's army took Columbia the shed in the yard of the Statehouse, in which the bells had been placed, and which also contained the marble friezes and other sculptures intended for the decoration of the capitol, was broken into and the sculptures and bells smashed into fragments, and the shed was then set on fire. At the conclusion of the war the pieces of the bells were carefully gathered together, boxed and shipped to the commercial house of Frazier, Trenchard & Co., of Liverpool, together with extracts from the records of St. Michael's showing where the bell were cast and the proportions of the metals forming their component parts. Upon inquiry it was found that there was still in existence in England the firm of bell-founders, unchanged in name, and consisting of the descendants of the proprietors at the time the bells were made. The records of this firm contained descriptions of the bells, and the proportions there given were found to correspond with those furnished from Charleston. The bells were made anew, therefore, of the same metal, and for the fifth time were carried across the Atlantic, and arrived safely at Charleston. The return was made the occasion of great rejoicing in the city.

A writer in the *Revue Scientifique* affirms that, from a comparison of animal and steam power, the former is the cheaper power in France, whatever may be the case in other countries. In the conversion of chemical to mechanical energy 90 per cent. is lost in the machine, against 68 in the animal. M. Sanson, the writer above referred to, finds that the steam horse-power, contrary to what is generally believed, is often materially exceeded by the horse. The cost of traction on the Mont Parnasse-Bastille line of railway he found to be for each car, daily, 57 francs, while the same work done by the horse cost only 47 francs; and he believes

that for moderate powers the conversion of chemical into mechanical energy is more economically effected through animals than through steam engines.

NEW PUBLICATIONS.

AMERICAN NEWSPAPER ANNUAL. Size 6 1/2 x 10 inches. 1010 pages. Published by N. W. Ayer & Son. Price, \$3.

N. W. Ayer & Son's "American Newspaper Annual" for 1886 has just appeared, and, as usual, furnishes a vast amount of highly interesting information. It contains a carefully-prepared list of all newspapers and periodicals in the United States and Canada, arranged by States in geographical sections, and by towns in alphabetical order, giving the name of the papers, the issue, general characteristics, year of establishment, size, circulation and advertising rates for 10 lines one month; a list of all newspapers inserting advertisements, arranged in States by counties, with the distinctive features and circulation of each paper; also complete lists of all the religious or agricultural periodicals, of medical, commercial, scientific, educational or any other of the class publications, as well as all publications printed in foreign languages. It contains, besides, a large amount of general and statistical information of practical value to almost every business man, and is in its line as deserving a place on desk or in library as Webster's Dictionary or a first-class encyclopedia.

One of its chief features is a carefully prepared description of every county in the United States, setting forth its location, area, adjoining navigable streams, the character of its surface, the nature of its soil, its leading crops and manufactures, its county seat and population. A similar, but more elaborate, descriptive heading is appended to each State, Territory and Canadian Province. These headings are subject to constant and careful revision. The growth and development of the various sections are noted and embodied in them from year to year, thus forming a valuable compendium of the physical features and the agricultural and manufacturing resources of the country. Another valuable feature has recently been added to these headings. They now show from the United States census of 1880 the number of manufacturing establishments of all kinds at that time, the amount of capital invested in them, the number of hands employed, and the value of annual products. The State headings show, in addition to the summary of the foregoing, the amount paid in wages, and the value of the raw material used. It gives the population of every State, Territory, county and county seat, of all the large cities and towns, and of almost every place in which a newspaper is published, taken either from the United States census of 1880 or from the State census of 1885 in every instance where such census was taken, or from recent careful estimates. It also gives the political majority of every State, Territory and county, and the number of votes polled by the Greenback and Prohibition parties at the Presidential election of 1884. Among its exhaustive and interesting tables are those showing the cities, towns and villages of the United States having a population of 5000 and upward, arranged in alphabetical order; how many counties there are in each State; in how many of these newspapers are published, in how many towns of each State newspapers exist, and how many of these towns are county seats, and how many newspapers there are altogether in the country at large, or in any of its great sections, or in any State, Territory or Canadian Province, or how many there are of each issue, and a comparative statement of the increase in 1886 over 1885. Absolute perfection in a work of this character is an impossibility, but undoubtedly all that painstaking effort could do to prevent error has been done in the present edition.

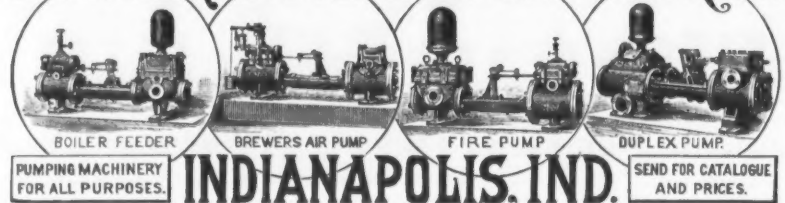
The last London *Economist* has some interesting tables illustrative of the effect of the fall in the value of silver on trade. The bimetallicists maintain that it has been very great, but have never been able to produce in support of their assertions facts not explainable on any other hypothesis. It so happens that while British imports from silver-using countries declined considerably after 1876, and were very high in 1882-83, they have been nearly steady during the other years which have since elapsed. On the other hand, British exports to silver-using countries have risen almost steadily since 1876. We reproduce the totals in millions:

Trade with Silver-Using Countries.		
Year.	Imports.	Exports.
1873.....	\$28,071	\$26,187
1884.....	61,851	60,075
1885.....	72,917	69,038
1886.....	75,900	65,409
1881.....	65,039	65,859
1880.....	66,732	64,197
1878.....	63,638	51,421
1879.....	71,241	50,471

All indications available are that, within reasonable limits, of course, the larger the grate in a locomotive the better, because the rate of combustion per square foot of area is now faster than it should be. Considerable difficulties naturally stand in the way, and prevent and restrain the locomotive builder, but, after making every allowance for this, it may be held that grates and fire-boxes might in a great many cases be larger than they are now. It is certain that a step must be made in this direction if express trains are to go on increasing in weight and speed. A big fire box is the cheapest possible expedient for augmenting boiler power.

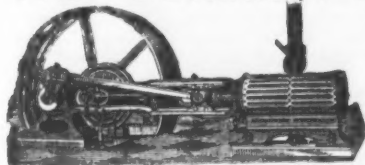
From the opening of navigation at Montreal to October 31st, 431 steamships arrived at that port, with a tonnage of 593,456 tons, against 350 steamships and a tonnage of 491,724 tons for the corresponding period of last year, while the number of sailing ships was not quite as large. The live-stock trade of Montreal this year to date has been the largest on record. A total of 255,000 animals was received at Point St. Charles up to September 1, being 170,790 more than during the corresponding period last year.

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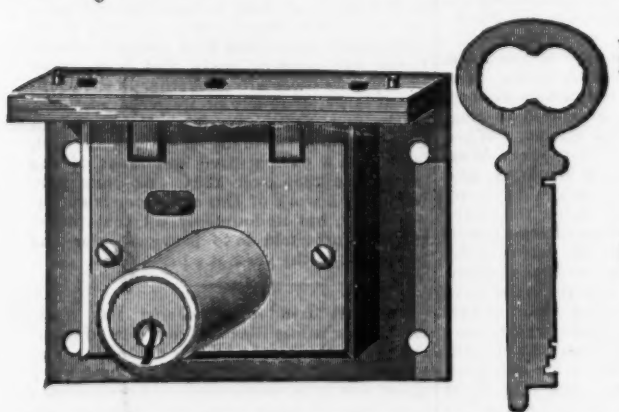
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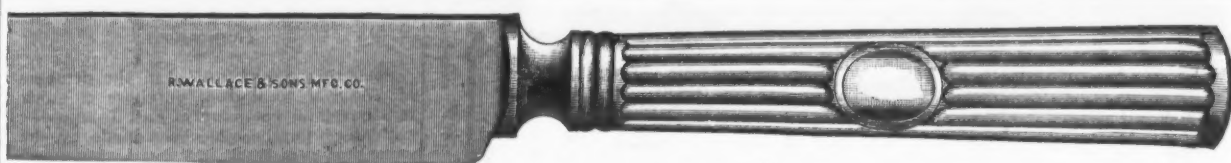
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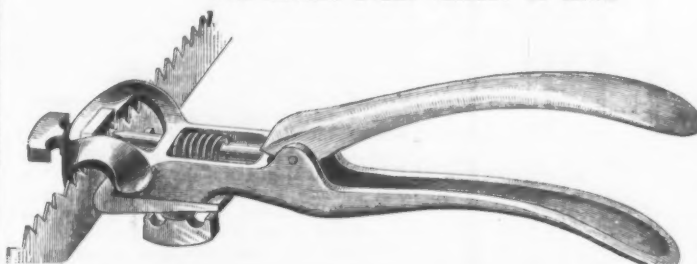


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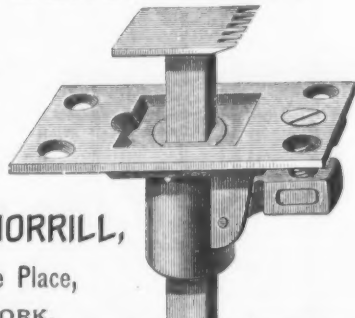
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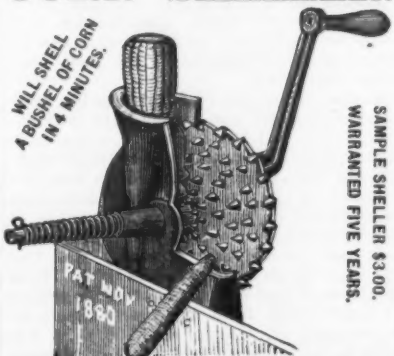
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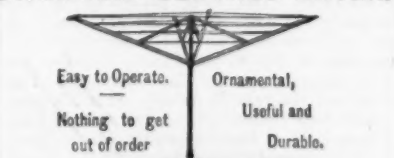


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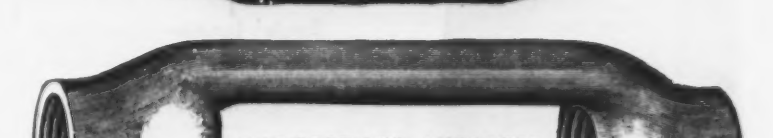
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Iron, Steel and Metallurgy.

Directory to the Iron and Steel Works of the United States. Prepared by the American Iron and Steel Association; 8th edition, corrected to July 15, 1886; 207 pages, 8vo, cloth. . . . \$3

The present volume embodies a most thorough revision of the preceding edition, issued in 1884, with valuable additions. It embraces a complete list of all the blast furnaces, rolling mills, steel works, forges, bloomeries, nail works, wire mills, wire nail works, car works, car-axle works, car-wheel works, locomotive works and iron-pipe works in the United States, all properly classified and alphabetically arranged. A table of contents and a complete index facilitate reference.

Greenwood.—Steel and Iron. Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the Rolling Mill, the Forge and the Foundry. By W. H. Greenwood; 97 illustrations, 536 pages, 12mo, cloth. . . . \$2

This work satisfactorily presents in convenient form the most important processes employed in the manufacture of iron and steel. The illustrations are in most cases reduced from actual working drawings. The style is simple and clear. Although many of the recent improvements in American practice have not received the thorough attention which they merit, the book treating more particularly of English practice, the author has succeeded in producing a comprehensive manual for the technical student, and an intelligible and valuable assistant to the practical iron-worker. The chapter headings are as follows:

Explanation of Terms; Refractory Materials, Crucibles, &c.; The Ores of Iron; Metallurgical Chemistry of Iron; Cast or Pig Iron; The Production of Pig Iron; The Blast Furnace; Hot-Blast Stoves, Hoists, Lifts, &c.; Fuel, Blast, Charges, Yield and Waste Gases of the Blast Furnace; Castings in Iron, Foundry Appliances, &c.; Malleable or Wrought Iron; The Production of Malleable Iron Direct from the Ore; Indirect Methods for the Production of Malleable Iron; The Production of Malleable Iron in Open-Hearth Furnaces; Refining of Pig Iron; Puddling; Mechanical Puddling and Rotary Puddling Furnaces; Forge and Mill Machinery, Furnaces, Plant, and Operations; Steel and Ingot Iron; The Methods Employed in the Production of Steel Direct from the Iron Ore and by the Carburization of Malleable or Bar Iron, by the Decarburization of Pig Iron in the Finery or in the Puddling Furnace, by the Fusion of Pig Iron with Malleable Iron or with Iron Ores in the Open-Hearth Steel-Melting Furnace; The Bessemer or Pneumatic Process for the Production of Steel from Pig Iron; The Basic Process for the Conversion of Phosphoric Pig Iron into Steel in the Bessemer Converter; The Production of Homogeneous Steel Ingots, Fluid Compression of Steel, Compound Armor Plates, &c.

Bell.—Principles of the Manufacture of Iron and Steel, with Some Notes on the Economic Condition of Their Production. By I. Lowthian Bell, F.R.S.; 10 full-page plates, 744 pages, 8vo, cloth. . . . \$6

This extended and comprehensive treatise is an outgrowth, as stated by the author in his introductory chapter, of a request, from the British Iron Trade Association, to prepare a report on the present condition of the manufacture of iron and steel as illustrated by the objects displayed at the French International Exhibition of 1878, in Paris. This work contains not only the general results then arrived at, but also more extended investigations and experiments which it was considered necessary to pursue to thoroughly discuss the subjects under treatment. The appended headings of the 18 sections into which the volume is divided will give an idea of its scope:

Section I. Introductory. Section II. Historical. Section III. Direct Processes Preliminary Treatment of Materials for the Making Malleable Iron. Section IV. for Blast Furnace. Section V. The Blast Furnace. Section VI. On the Use and Theory of the Hot Blast. Section VII. On the Quantity and Quality of the Fuel Required in the Blast Furnace Using Air of Different Temperatures. Section VIII. On the Solid Products of the Blast Furnace. Section IX. Chemical Changes as They Take Place in the Blast Furnace. Section X. On the Equivalents of Heat Evolved by the Fuel in the Blast Furnace. Section XI. On Hydrogen

and Certain Hydrogen Compounds in the Blast Furnace. Section XII. On the Production of Malleable Iron from Pig Iron in Low Hearths. Section XIII. On the Refining and Puddling Furnace. Section XIV. On More Recent Methods of Separating the Substances Taken Up by Iron During Its Passage Through the Blast Furnaces. Section XV. Statistical. Section XVI. British Labor Compared with That of the Continent of Europe. Section XVII. On Labor in the United States of America. Section XVIII. Chief Iron-Producing Countries Compared.

Bauman.—Metallurgy of Iron. By H. Bauman; 5th edition, revised and enlarged, 58 illustrations, 515 pages, 12mo, cloth. . . . \$2

This work treats of the physical properties of iron ores, and the most approved means of reducing them to the purposes of the manufacturer. The methods of assay and analysis of iron ores are practically considered, as also their composition and distribution. The subject of blast furnaces, their capacity and production, has also received careful attention. In the present edition the author has added to the chapter on Steel Making, and has explained and illustrated the progress recently made in the process of steel manufacture, both of Siemens and Bessemer, especially the latter, by the adoption of lime as a dephosphorizing agent. The book also contains a chapter on the mechanical properties and tests of Malleable Iron and Steel. The author has succeeded in his avowed attempt to supply much practical and reliable information for ironworkers and others, in condensed form.

Thurston.—Materials of Engineering. By Robert H. Thurston, C. E., Professor of Engineering, Stevens Institute of Technology.

Part II, Iron and Steel; 143 illustrations, 680 pages, 8vo, cloth 1885 \$5

In this, the second volume of Professor Thurston's important work on the materials of engineering construction, the author has included a large amount of practical information not heretofore available without consulting many different authorities. The ores of iron, their classification, analysis and reduction have received thorough treatment. The construction and management of blast furnaces and the different operations connected therewith are comprehensively detailed. The subject matter comprehends all the practical operations employed in the manufacture of iron and steel, so simply expressed as to be readily understood by those of limited education. There are several chapters upon the strength, elasticity and resistance of the metals treated, under the effects of time, temperature and repeated strain, with the necessary formulae and diagrams. The work is valuable not only as a text-book for the student and engineer, but equally so as a work of reference for the manufacturer and mechanic. Considerable space is given to the most approved methods of manufacturing malleable iron, and the tests of iron and steel are carefully considered and illustrated by recent examples.

Gruner.—The Manufacture of Steel. By M. L. Gruner; 9 plates, 196 pages, 8vo, cloth; . . . \$3.50

In this translation from the French, the author critically considers the nature of steel, the methods of refining pig iron, and describes the theory and manufacture of steel by cementation and the Bessemer process in all the countries of Europe. There is also an appendix by the translator, Lenox Smith, on the Bessemer process in the United States.

Percy.—Manufacture of Russian Sheet Iron. By John Percy; 12 illustrations, 23 pages, 8vo, pamphlet; . . . \$0.50

This little pamphlet, by a well-known English author, consists chiefly of a description of various methods of making sheet iron as practiced by Russian engineers. The information is very complete, considering the size of the work, and there is an appendix upon the manufacture of American sheet iron.

Kunhardt.—The Principles of Ore Dressing in Europe. By Wheaton B. Kunhardt M. E.

A description of foreign methods for the mechanical concentration of ores. The various operations of sizing, sorting, cleansing and separating ores by hand and by machines, and the methods employed in the prominent European works, are explained. To mining engineers the book should prove of special interest as showing the recent improvements and great development in the mechanical treatment of ores during the past few years.

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A practical treatise on the management of cupolas and the melting of iron. The author, a practical foundryman, treats of the molder and his trade, green-sand molding; loam and dry-sand molding, and the manipulation of iron castings. The work is a valuable addition to the list of books upon this subject.

West.—Moulder's Text Book; being Part II of American Foundry Practice. By Thomas D. West; 146 illustrations, 461 pages, 8vo, cloth. . . . \$2.50

This volume, in connection with the author's previous work entitled "American Foundry Practice," affords a thorough presentation of the latest and best methods of foundry practice. Beginning with articles on sound casting and defects in structural castings, the various chapter headings include Progress in Molding; Novelties in Foundry Practice; Geometry in the Foundry; Procuring Clean-Finished Castings from Dry Sand and Loam Molds; High Art Molding in Loam and Dry Sand; Manipulating of Cores; Procuring Clean-Finished Castings from Green Sand Molds; Methods and Rules for Green Sand and General Molding; Elements and Manufacture of Foundry Facing; Welding Steel to Cast Iron and Mending Cracked Castings; Foundry Addition; Ovens and Pits; Ladle and Casting Carriage Combined; Making Chilled Rolls and Roll Flasks, Runners and Gates; Molding Machines; Equivalent Areas for Round, Square and Rectangular Pouring Gates; Errors in Figuring Weights of Castings; Utilizing Cast Steel Scrap; and several contributed chapters on melting small quantities of iron, making a curved pipe from a straight pattern, making pipes on end in green sand, three ways of making an air vessel and a method of molding gear-wheels. The subjects of Cupolas and their Construction, and the Melting of Iron, are extensively treated. There are also included 46 reports of cupola workings collected from 30 States. Each firm's name and the line of castings made are given, making these reports valuable in giving so many different men's ideas and practice in mixing and melting iron.

Larkin.—The Practical Brass and Iron Founder's Guide. By James Larkin; 5th edition, revised, 301 pages, 12mo, cloth; . . . \$2.25

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Spretson.—Casting and Founding. By R. E. Spretson; 2d edition, with 82 plates drawn to scale 412 pages, 8vo, cloth. London . . . \$5

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Wylie.—Iron Founding. By Claude Wylie, with diagrams; 164 pages, 8vo., cloth. London. . . \$1.40

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Ricketts.—Notes on Assaying and Assay Schemes. By P. De Peyster Ricketts, Ph.D., Instructor in Assaying in the School of Mines, Columbia College, New York; 6th edition, revised and enlarged, illustrated, 210 pages, 8vo, cloth; . . . \$3

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Troilius.—Notes on the Chemistry of Iron. By Magnus Troilius, E. M.; 9 illustrations, 97 pages, 8vo, cloth. . . . \$1

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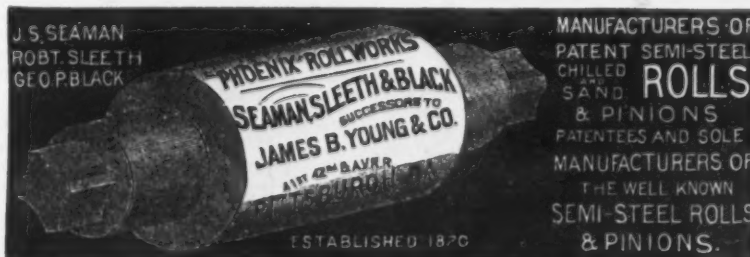
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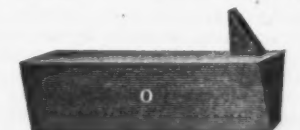
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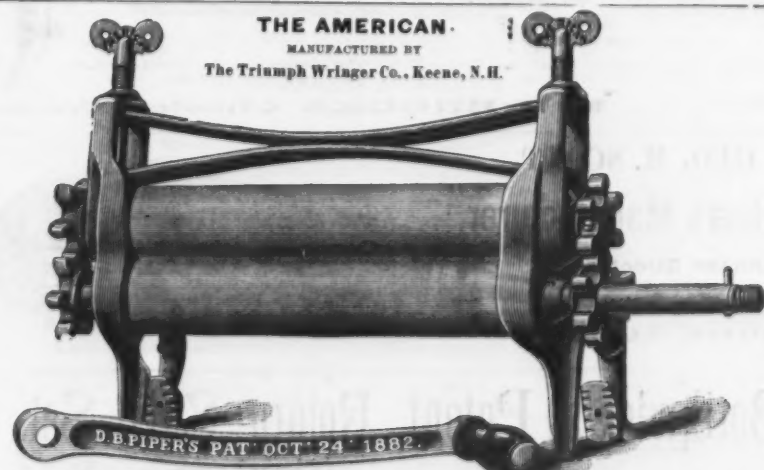


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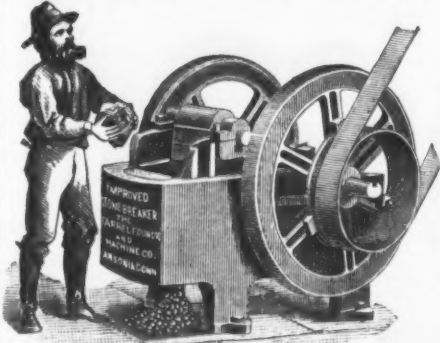


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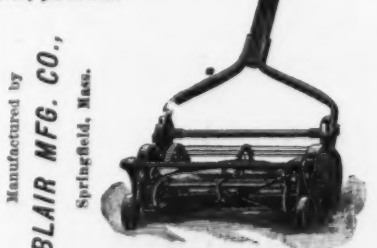
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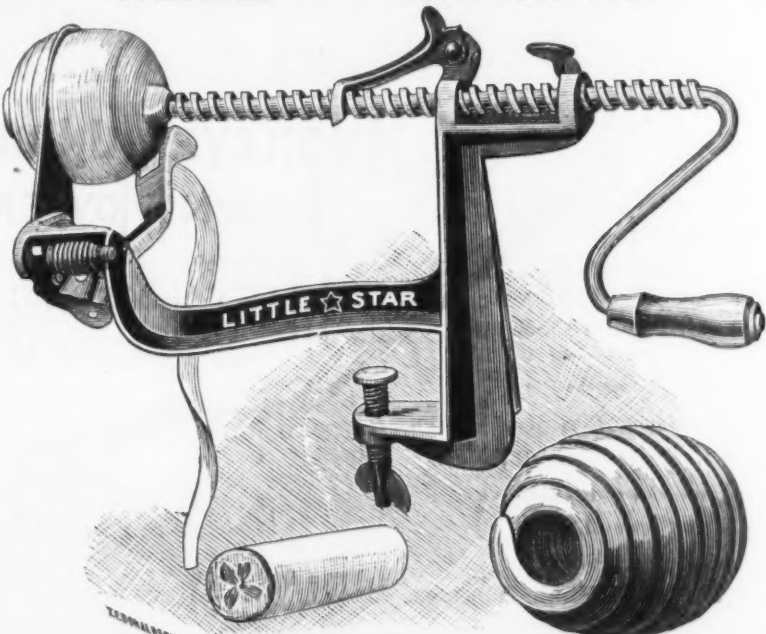
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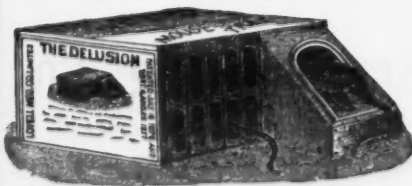
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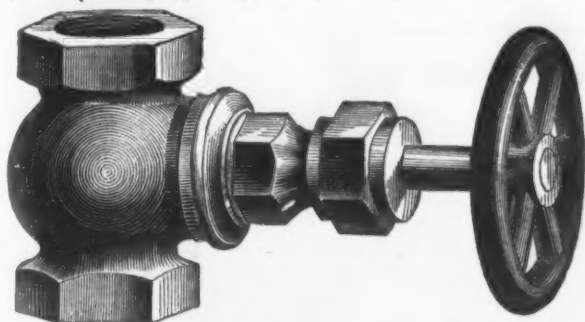
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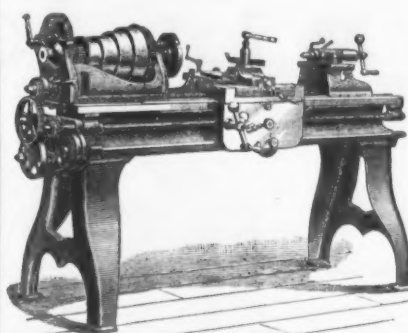
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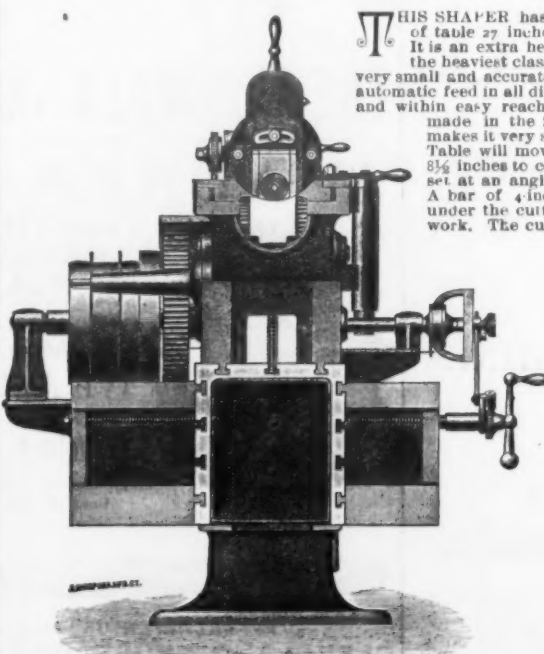


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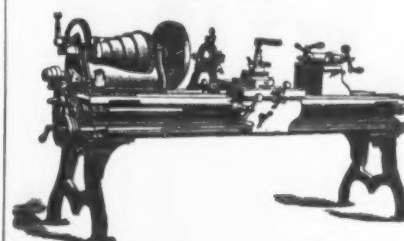
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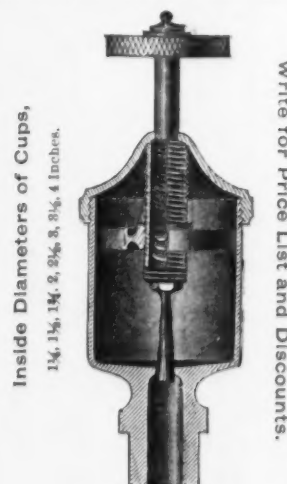
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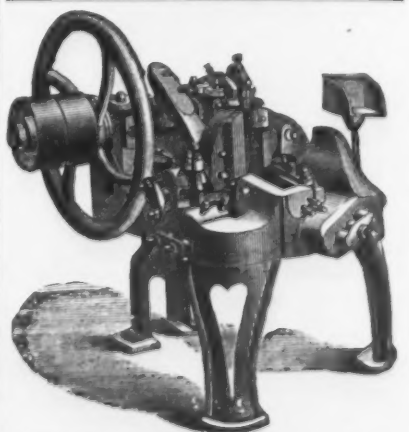
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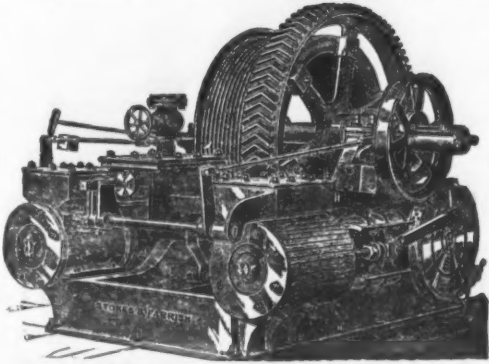
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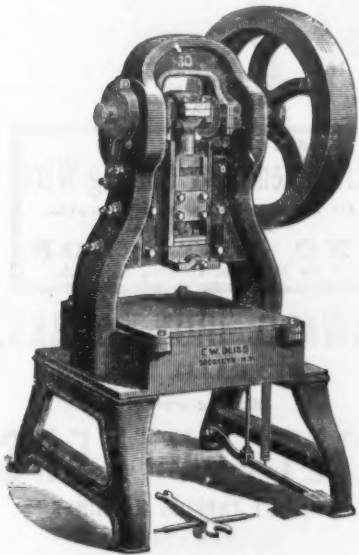
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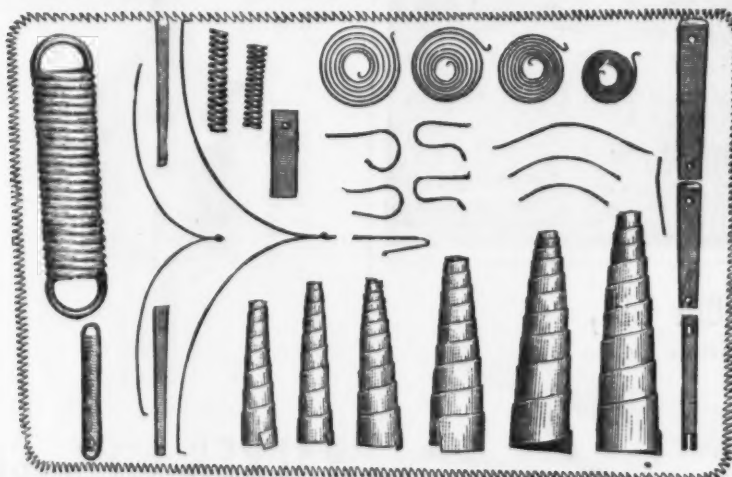


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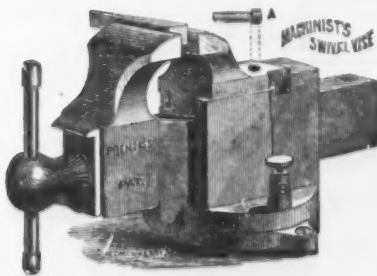


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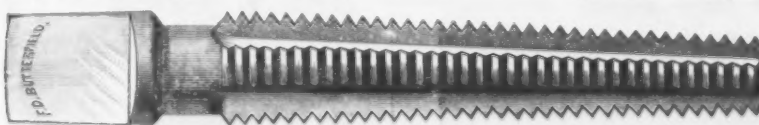
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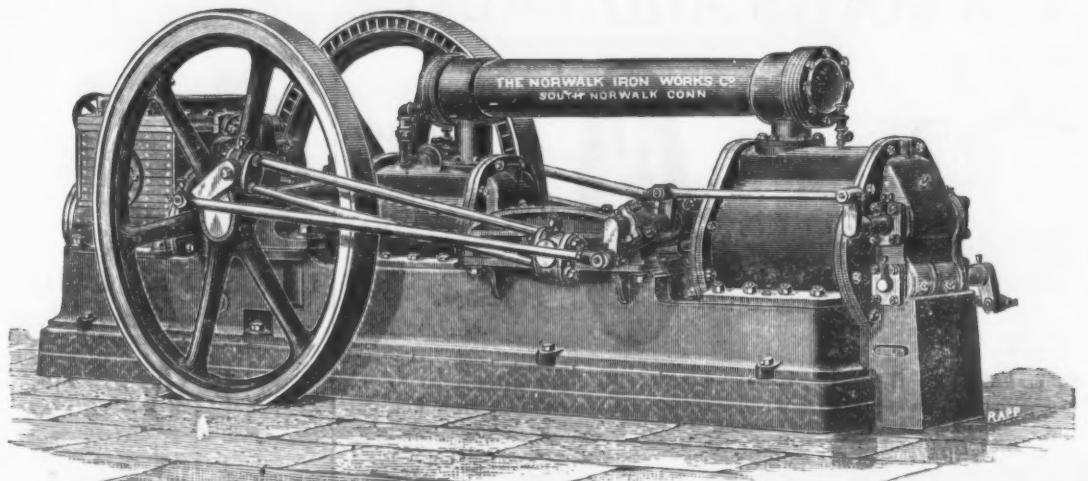
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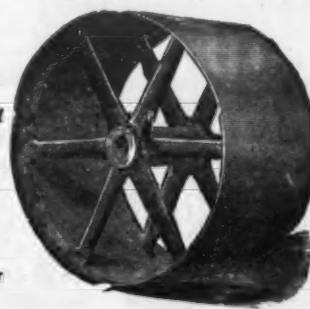
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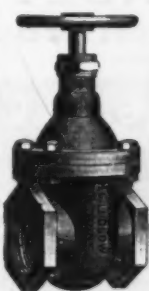
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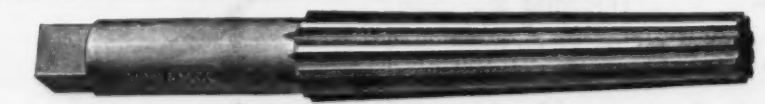
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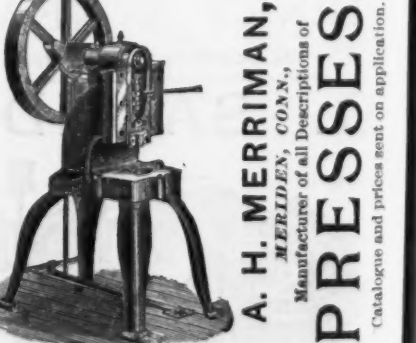
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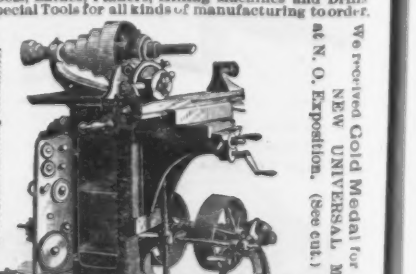
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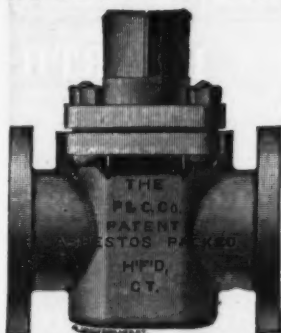
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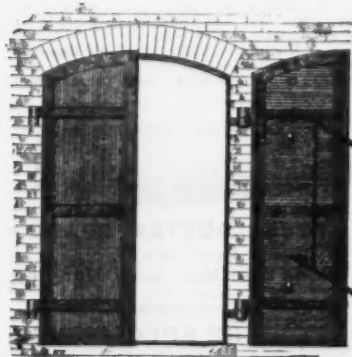
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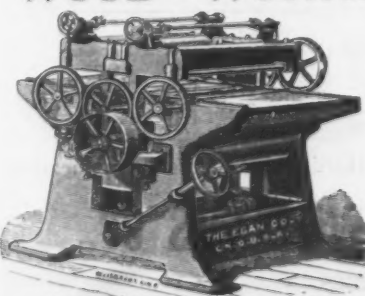
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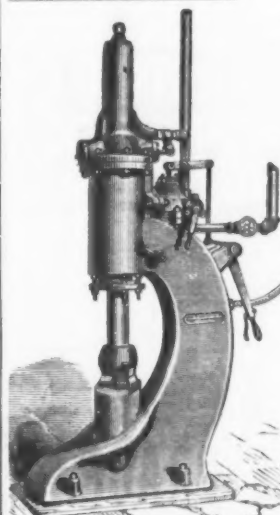
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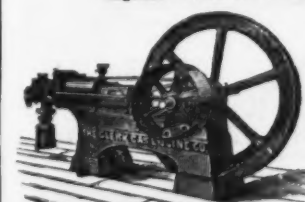
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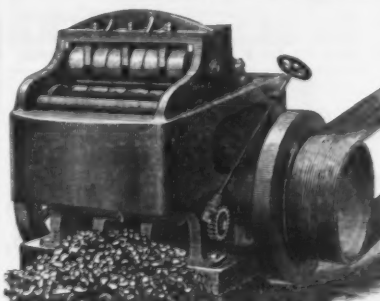
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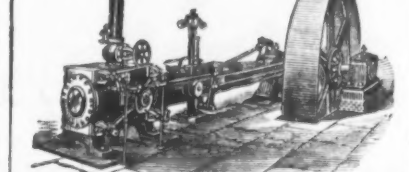
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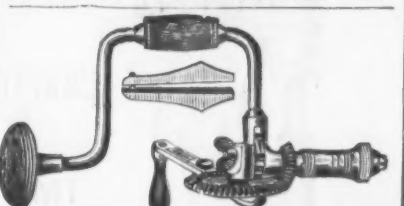
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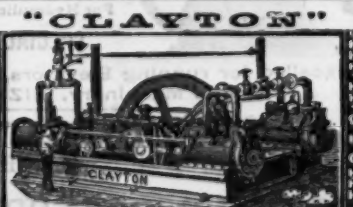
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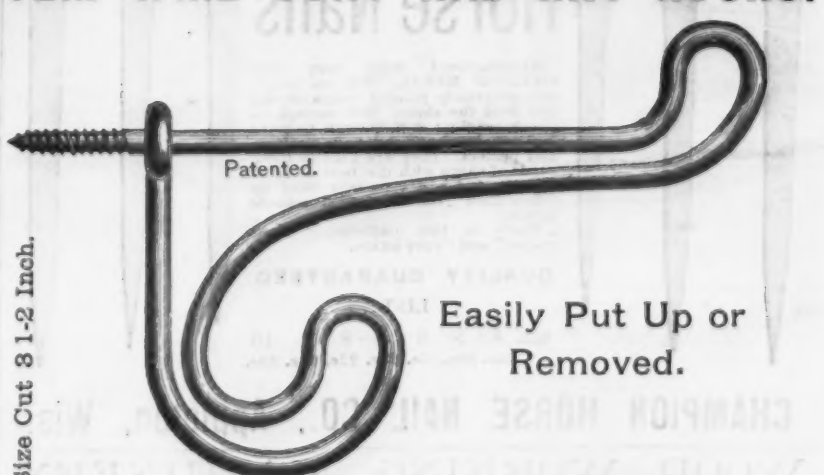
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